ESTABLISHED IN 1872

PAPER TRADE JOURNAL

With Which Is Combined

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New Weyerhaeuser Pulp Mill Begins Operating

Located At Longview, Wash., Ultra-Modern Plant, Designed to Readily Accommodate Further Expansions, Has Capacity of 175 Tons of Sulphite Pulp Daily—Each Unit May Be Duplicated or Enlarged Without Disturbing Balance of Mill—Excellent Equipment Installed In Bleach Plant Assures Accurate Control

Operation of the new 175-ton sulphite pulp mill, built for the Pulp Division of the Weyerhaeuser Timber Company, at Longview, Wash., was begun November 16, approximately seventeen months after the formal announcement was made that a plant would be built. Actual construction started less than a year ago.

Complete design and supervision of construction of the new pulp mill has been capably accomplished by O. C. Schoenwerk, of Winnetka, Ill. Mr. Schoenwerk was the designer of the Olympic Forest Products Company's mill at Port Angeles, Wash. Prior to his present engineering practice, he was active in pulp and paper making on the west coast in a managerial and operating capacity. He has incorporated into the new Weyerhaeuser pulp mill a rich fund of knowledge and experience accumulated from a field of wide activity.

The pulp mill was developed by Mr. Schoenwerk with straight line flow of materials from their raw state to the finished product. The operating equipment, piping and machine footings were laid out in their entirety without regard to the buildings, the focus of design being on the physical factors which enter directly into the pulp making process. The buildings are secondary to the equipment, serving merely as protective enclosures. In spite of this secondary consideration, the buildings have been developed in a manner which gives a pleasing architectural unit. The plant is designed to readily accommodate further expansion. Each unit may be duplicated or enlarged without disturbing the balance of the mill.

All the equipment installed in the new mill has been thoroughly proven and is the finest and most modern available. In some instances it has been necessary for manufacturers to redesign mechanical features of their machinery to meet the exacting specifications of Mr. Schoenwerk.

Wood Extensively Used

An exceptionally clean pulp is one of the requirements set by the Weyerhaeuser Timber Company for their finished product. To accomplish this, Mr. Schoenwerk has used continuous stave wooden pipe for all stock and water lines, all stock storage tanks, white water tanks, acid tanks, blow pits, machine head boxes and rifflers. The continuous stave wood pipe used throughout the entire mill is found at close intervals with individual steel bands. These bands, being external and individual, provide for any adjustments in tension that might be necessary. Over 120,000 feet of kiln dried Douglas fir and cedar has been used in the construction of wood pipe alone. The lumber from which this pipe has been made was cut and prepared by the Longview branch of the Weyerhaeuser Timber Company. All fittings connecting to, or integral with, the wood pipe installation are of leadized steel. The lead coating completely insulates the steel from exposure, both inside and out, allowing no stock or water to come in contact with the steel, entirely eliminating rust formation which might find its way into the pulp.

Cleanliness Paramount

The acid, stock and white water tanks, blow pits, headboxes and rifflers are built of Douglas fir. It is imperative that these elements of the mill, in which the pulp and other materials contributing to its manufacture are stored or processed, be immaculately clean. Any substance foreign to the pulp which might be picked up in this processing would be detrimental to the ultimate product. Wood has proven itself to be ideally adapted for handling water, stock and acid, and is also an economic material to use for these purposes.

In designing the rifflers, Mr. Schoenwerk has developed them as an integral part of the building which houses them. The riffler bottoms serve also as the structural members of the floor.

The chipping plant, chip storage and pulp storage warehouse are entirely of wood and timber construction. The bleach building and machine room are of concrete with wooden trusses and roofs. The screen rooms are constructed of concrete with wooden beams, roofs and columns. The galleries, housing the belt chip conveyors, are of all wood construction. The water supply lines, sewers and sewer sumps are also constructed of wood. Cedar, which has an almost indefinite life, was used for underground piping.

Filter Plant

In manufacturing pulp, great volumes of water are used throughout the pulp making process. Water is not only an element of chemical combination but is also the transporting medium used to convey the fibres from one phase of

the process to the next. In this connection, Mr. Schoenwerk has recognized the necessity of a clear, pure water supply in making high quality pulp.

The filter plant provided has a capacity of 20 million gallons a day. Raw water is taken from the Columbia river through a 40 inch wooden pipe. At the filter plant it is treated with chemicals which form a precipitate of all mineral and organic substances in the water. The chemicals are charged in large concrete mixing tanks from which the water is flowed into two 1,780,000 gallon settling basins. In these large basins, the coagulate formed by the chemicals added, is allowed to settle out, only the clear water from the top of the basins being skimmed off. The clear water from the settling basins is passed through sand filters to completely remove any burden it might be carrying. The filtered water is rendered sterile by chloramine treatment.

A group of three pumps is provided which have been designed to carry a continuous uniform pressure through the mill regardless of the volume demand. This constant water pressure makes possible the elimination of consistency variation throughout the pulp making process.

Chipping Plant

The pulp logs are broken down by one of the Weyerhaeuser Timber Company's saw mills into cants. The cants are conveyed to the chipping plant and transferred to four power barkers which cut the bark from the wood. From the barkers, the cants pass progressively to the knot saws and knot boring machines, which remove all black knots and unsound portions of the wood. After the knots and blemishes have been removed, the cants pass a rigid inspection and are washed with heavy showers.

This clean wood is fed into chippers of exceptionally heavy construction which reduce it to chips of uniform length. The chips are screened over four shaker type chip screens to insure uniformity of chip size, and taken by a belt conveyor to the chip storage plant.

The chipping plant is of dust proof construction, as are also the housings of the chip conveyors. By ventilating this building with washed, filtered air, the possibility of dirt in the chips is eliminated.

Chip Storage

The chip storage plant is a wooden building, designed to carry the maximum amount of chips at their natural angle of repose. The chips conveyed into the top of the chip storage fall into a pile which conforms to the curve of the Lamella type roof used.

Bins have been provided to allow segregation of chips where this is desirable. These chip compartments are so designed that a complete cross section of the bin is moved out on its individual conveyor whenever chips are withdrawn. This insures complete rotation of the contents of the bin.

The chips are drawn from the chip storage on belt conveyors, these belts being fed by mechanical feeders. The conveyors carry the chips to the digester house over the digesters, where they are automatically fed into the digesters.

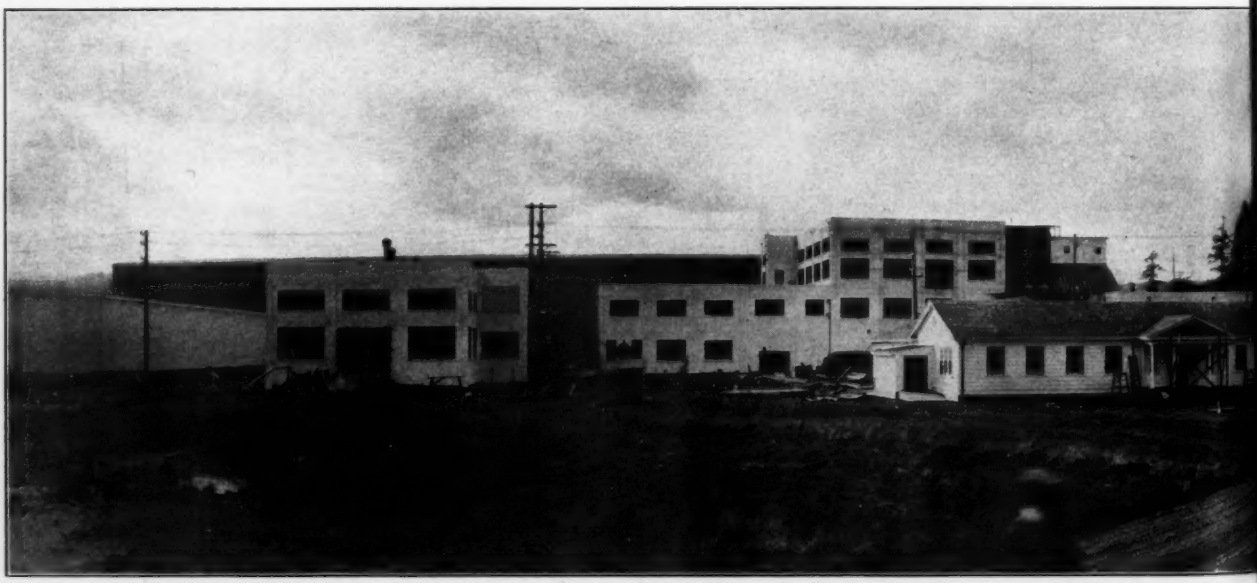
The operator of the digesters controls all chip feeding from the operating floor, the entire procedure being mechanical and under his control.

Acid Plant

The acid plant with equipment has been furnished by the G. D. Jenssen Company. All finished raw acid is filtered through a large capacity sand filter before being pumped to the storage tanks. This filtering frees the acid from particles of dirt picked up from the lime rock towers and the general acid making process.

The Chemipulp recovery system installed accumulates the relief gases and heat from the digesters.

In addition, apparatus has been provided for building up the strength and controlling the composition of the raw and recovered acids independent of water temperature, moisture in chips and physical characteristics of the lime rock. These features are of the utmost importance for they give abso-



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PANORAMIC VIEW OF THE WEYERHAEUSER TIMBER COMPANY'S NEW PULP

Paralleling the Columbia river waterfront on the west portion of the Weyerhaeuser Timber Company's 700-acre site at Longview stands the new pulp mill. In the background can be seen historic Coffin Rock, old Indian burying ground beyond which is the Columbia River. The huge shed in the background at the left end of the panorama is a lumber storage shed fronting on the loading docks. Reading from right to left, in the direction of the pulp making process, the buildings are: (1) The 20,000,000 gallon daily capacity filter plant which provides water from the Columbia River for the pulp process. The frame work in front of the mill and water tower is merely a pile driver. (2) The acid plant. Note the Jenssen towers, the sulphur storage tanks and the low building wherein the sulphur burners are located. (3) The digester building, containing six 15-ton digesters. (4) The blow pits and vomit stacks photographed as a digester was being blown during the first few days of operation. (5) The building housing the unbleached screen equipment is mostly hidden behind (6) the

lute control of the quality of the acid, thereby eliminating one of the most prolific sources of variation in the quality of the pulp.

Digesters

There are six digesters, each with a capacity of fifteen tons. In order to insure uniformity and high quality in the finished pulp, relatively small digesters were specified by Mr. Schoenwerk. These digesters, with their measured control of intake steam and regulated relief, will minimize variables in cooking and insure positive circulation of the cooking liquor. By using a larger number of smaller digesters rather than a few large ones, peak steam loads are eliminated and steady steam pressure is the resultant. The smaller, more frequent charges of acid, level off the demand on the acid plant, allowing a uniform acid composition.

Blow Pits

Each digester has its individual blow pit equipped with stainless steel bottoms and target plates. The blow pits have been designed to furnish the maximum of washing and draining area. The washed stock from the blow pits is pumped over an Oliver washer. This operation further washes the stock and a regulator controls consistency before dropping it into a fifty ton blending tank. The stock in this large wooden blending tank is circulated and mixed by specially designed screw type pumps. With this special equipment, blending of the pulp is accomplished without hydration.

Unbleached Screen Room

The washed and blended pulp from the blending tank is pumped to the coarse screens where a controlled quantity of water is added to maintain uniform consistency. After removing the knots in the coarse screens, the stock is run over rifflers 8,000 square feet in area. From the rifflers, the pulp is directed by gravity flow over 48 fourteen-plate inclined flat screens. The water added to the pulp at the flat screens is measured proportionately to the volume of stock passing through the screens. After screening, the stock is passed over deckers and thickened to a predetermined controlled consistency and then pumped to the unbleached stock storage tank.

Bleach Plant

Three stage bleaching is employed for several reasons. By gradually reducing the colored material remaining in the pulp and employing thorough washing between each stage, a complete removal of colored residue may be accomplished without weakening the physical characteristics of the original unbleached pulp.

The design of the bleach plant and excellent equipment installed, provide accurate control of pulp consistencies, temperatures and chemical concentrations throughout the bleaching processes. Much stress has been laid on thorough washing after each stage of bleaching. Clear, sterile, fresh water is used in the final washings, and the pulp coming from the bleachery is a neutral mass of cellulose fibers.

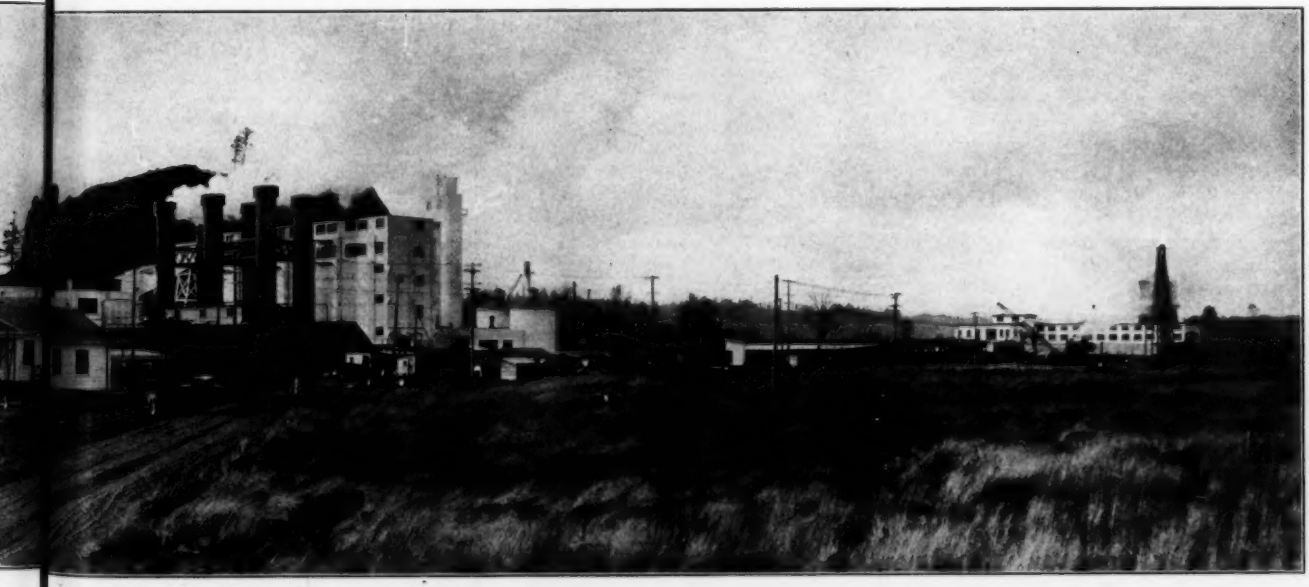
To further protect the finished product from contamination by substances other than papermaking fibers, the pulp is run over a second set of rifflers 6,500 square feet in area and through a second battery of 16 fourteen-plate inclined flat screens. This second riffling and screening insures the removal of any substances foreign to the pulp which might be picked up in process operations. In this process, as in all others, a constant predetermined consistency of the stock is maintained by volumetric control of the water added.

After this final screening, the stock is thickened and pumped into a second blending tank of 50 tons capacity. The same type of screw pump agitator is employed in this unit as that used in the unbleached blending tank.

Drying Machine

The drying unit consists of a 156 inch Fourdrinier wet end with seven suction flat boxes, suction couch roll and two suction press sections. Equipped with an automatic weight

(Continued on page 48)



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MILL AT LONGVIEW WHERE HIGH GRADE BLEACHED SULPHITE PULP IS PRODUCED

office building. Above figure (7) can be seen a portion of the roof of the chip storage building which is connected by a half mile belt line with the chipping plant at the sawmill some distance beyond the left extremity of the picture and also on the river front. (8) The bleachery in which tile lined pits are housed. (9) The screen room for bleached pulp. The spacious pulp mill laboratory is located in the lower left corner of this building where the doorway can be seen. (10) The 50-ton blending and storage chest is located here between the bleaching building and the machine building, which is at (11). At (12) can be seen a portion of the 6,000-ton pulp storage warehouse. This, the office building and chip storage building are wood construction. The vomit stacks are also of wood stave, bound with steel bands.

Paper Demand Moderately Active In Chicago

Drop In Quotations On Rag Content Papers Features Week's Trading—Kraft Wrapping Paper Holding to Recently Established Levels—News Print Situation Reported More Favorable—Book and Cover Papers Moving Very Slowly

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., December 26, 1931—Following the leveling off of rag content papers the Chicago paper market remained steady and there are indications that the first real "bottom" has finally been reached, a basis from which some sort of improvement may be confidently expected. The leveling off of rag content papers, from the 100 per cent on down to the lowest grade, constituted about the last of the papers to hit the slide. The drop in rag content papers averaged about 10 per cent, according to reports here, with one grade dropping down around 6½ cents a pound.

Kraft is holding at the lows established some time ago and here, again, it seems as though some basis has been reached from which improvement may be made. Any uncertainty following the drop in contract prices for news print has disappeared and, all in all, opinions are now more favorable than for some time, based on the belief that the "worst is over". Books and covers remain fairly slow. The holiday business is not quite as good as expected and tissues are feeling the effects of this, say reports. The board market remained unchanged over the week. Waste prices are the same and the market reported inactive.

All in all, however, there is some improvement in business sentiment here. Despite the uncertainties of the outside world, paper representatives feel that every grade has been deflated, that paper will continue to be a very saleable commodity and that, after the first of the year and inventory period, some appreciable improvement may be noted based on absolute need and on the stabilization of prices at their low levels.

Paper Salesmen's Activities

The Middle West Division of the Salesmen's Association of the Paper Industry will hold its first meeting of the new year on January 4 and, at that time, an aggressive campaign will get under way, nominating committees for the annual meeting in New York will be appointed, and the regular weekly programs with guest speakers will probably be resumed. For the New York meeting, the big annual event with the salesmen and now doubly big because of the omission of the regular Fall meeting usually held in Chicago, Harold Knott, president of the association, announces that Bishop George Craig Stewart, chaplain of the association, has been secured for the main address at the annual luncheon to be held at the Hotel Pennsylvania at noon, February 16. Bishop Stewart is one of the finest of speakers, is a renowned scholar and student and his discussion of "Salesmen—the Key to Present Day Problems" is certain to be well worth hearing. At the New York meeting, says Mr. Knott, the formalities of golf trophy presentations which were passed over with the cancellation of the Fall meeting, will be carried out, although the big jollification golf party in November really took care of the golf prize business.

Paper Association Elects Committees

At its meeting on Tuesday evening, December 22, held at the Bismarck Hotel, the Chicago Paper Association announced committee appointments for the coming twelve months' period. Under the direction of president W. E. Beier and the executive board, these committees will function with the entire membership. Membership: I. Epstein, chairman; J. D. H. Murphy; Ed Ingalls; Peter Opila and Richard Blohm. Publicity: M. A. McNulty, chairman; William Rauth and Larry Newton. Credit: Carl M. Croegor, chairman; Fred Rudolph, John Hrdlicka and J. Lubin. Trade Relations: J. H. Murnane, chairman; H. G. Thoms; Norman Stone and Henry Weinstein. Attendance, George Malley, chairman; William Gaul and Mortie Inlander. Entertainment: Leo S. Altholz, chairman; William J. Shapland and Julius Lefkow.

News of the Trade

Otto Plett, formerly an executive of Libby, McNeil & Libby, is in charge of the newest manufacturers representative office in Chicago, that of the Package Paper Company, of Holyoke, Mass. The Chicago office of the well known manufacturers of parchment, glassine, waxed papers, etc., is in the Engineering Building at 205 West Wacker Drive. Mr. Plett was formerly in the purchasing and sales department at Libby, McNeil & Libby.

The advertising department, Printers Service Bureau, and Chicago sales office of the Munising Paper Company, manufacturers of Caslon Bond, were moved on December 21 from 411 West Ontario Street, Chicago, to 410 North Michigan Avenue, Chicago. Need for larger quarters necessitated by expansion of the Printers Service Bureau and the Caslon Bond Sales Promotion activities were given as the reason for the change of address.

The home offices of the Seaman Paper Company in Chicago were moved from 411 West Ontario street to 410 North Michigan Avenue on December 21. The new offices, which are in the Wrigley Building, are the same as those occupied by the Seaman company from 1924 to 1927.

George Gaw, official Chicago "greeter" and head of the Gaw-O'Hara Envelope Company, was the Santa Claus and distributor of presents to more than seven hundred advertising men and their friends who celebrated the annual Christmas party of the advertising council of the Chicago Association of Commerce, held at the Hotel Sherman on December 18. Proceeds of the big party, which found Greeter Gaw at his best as a rotund Santa Claus, go to the Off-the-Street Club, conducted for under-privileged children.

Seasonally correct and effective is the latest West Virginia Pulp and Paper folder describing Westvaco Inspiration Book, a popular new machine finished paper. The cover features some trim toy soldiers in red and green and the interior displays a striking winter scene setting forth the adaptability of Machine Finished Book for medium-screened half tones and lithographic printing.

S. L. Willson Club Elects Officers

HOLYOKE, Mass., December 22, 1931.—The Sidney L. Willson Club of the American Writing Paper Company, Inc., has elected these officers: President, Dwight K. Bartlett, Jr.; Vice President, Almer A. Giard; Secretary and Treasurer, John Leacock. The speaker at their meeting last week was the Comptroller of the Company who spoke on the late scientific advances.

If it isn't a VICKERY

it isn't uniformly FLEXIBLE

To keep your rolls the way you want them, you need a doctor that is flexible *under all conditions.*

That means Vickery Doctors. No other doctors in the world have two-way flexibility. No other doctors have it because the Vickery principle is patented.

Only Vickery Doctors can do a 100% job, continuously.

Papermakers of thirty-six countries will approve your judgment when you come to:

Doctor Headquarters

BIRD MACHINE COMPANY

SOUTH WALPOLE . . . MASSACHUSETTS

Hi-Flex

—the Vickery Doctor for calenders and super calenders—the type that re-established the practice of continuous doctoring in American mills.

Hi-Angle

—the Vickery Doctor for press rolls, driers, and all other machine rolls. Write for bulletins on these new Vickery Doctors.

VICKERY DOCTORS

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Demand for Paper Marks Time In Ontario

Mill Activity Well Maintained, Some Fine Paper Plants Running Near Capacity—Coarse Paper Market Listless, With Volume of Sales Below Normal for Season—Request for Grease Proof, Glassine and Waxing Papers Satisfactory

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 28, 1931—The wholesale paper trade in Ontario is marking time over the holidays. Most of the travellers are in and active resumption of business is not looked for until the first of the new year when it is expected that really good trade will develop. This is not expected, however, until the inventory season is over. That is on now by many of the paper consuming concerns and some of the paper houses themselves. In the meantime the paper merchants are taking a retrospective glance and are finding that despite the business depression of the past twelve months the year has produced a fair volume of business, although profits have been down. Fine paper demand was well maintained during the closing weeks of the old year and there was a satisfactory degree of activity both in the wholesale and distributing sections of the paper industry. On the other hand, the coarse paper market was more or less lifeless towards the end of the year and sales for the most part were light. Demand for grease proof, glassine and waxing papers kept up well until the year's close and the same may be said of tissues, toilets and light weight papers generally. There was little revival in business for the paper converting firms, such lines as envelopes and office stationery being in light call. Mill activity in most lines of paper keeps up well and in some branches operations have been touching close to capacity mark, chiefly with respect to fine papers.

Paper Mills Benefit from Cartel Break-up

Reported dissolution of the Swedish pulp and paper cartel was welcome news on the Pacific Coast, for British Columbia mills have suffered considerably by the competition of Swedish news print. The effects of the reported dissolution, however, have yet to manifest themselves. Operators point out that the new development may result in the independent Swedish companies further cutting prices, although some doubt is expressed as to whether this could be done unless the companies were prepared to take heavy losses. About 50,000 tons of Swedish news print has been imported by Pacific Coast consumers during the past year, and it is stated that this competition was largely responsible for the recent cut in news print prices announced by Powell River Company and Pacific Mills of the Crown-Zellerbach Corporation. Meanwhile, some interest has been aroused in the negotiations now proceeding for the acquisition of some 7,000,000,000 feet of timber in the Quatsino district of Vancouver Island by a syndicate said to include Crown-Zellerbach Corporation and the *Los Angeles Times* and *San Francisco Chronicle*, two of the largest paper consumers on the coast. The timber is now held by Falk Corporation, of Milwaukee, Wis. It is reported that the syndicate plans to take over the Vancouver Kraft Mills at Port Mellon, B. C., and there manufacture pulp from the Quatsino pulpwood and export the pulp to Crown-Zellerbach mills in the United States.

Chignecto Canal Would Affect Mills

Ontario and Quebec paper mills are interested in the proposed Chignecto Canal in Eastern Canada. It is contended that the canal will increase the demand for the limestone found at or near the coast of the Fundy waters, by pulp manufacturing companies located in Ontario and Quebec provinces. It is maintained that the marketing of the limestone to Quebec and Ontario pulp mills has been greatly handicapped by the high cost of rail transportation. There is an all-water route available, but this involves paralleling the entire peninsula of Nova Scotia, thus increasing the transportation cost. The canal would permit the loading of the limestone at the Fundy shore and shipment by schooner or steamer through the canal into the Gulf of St. Lawrence, the distance between the two waters being about sixteen miles. It is believed that there is a prospect of selling a large volume of pulp stone to the pulp companies with mills in Ontario and Quebec, when the canal is built, because of the shortening of the all-water haul, and corresponding reduction in cost. There is a large supply of stone suitable for the pulp mills along the two shores of the Bay of Fundy, particularly on the New Brunswick shore. The markets have been comparatively poor because of the high cost of transportation. The firms manufacturing pulp stones in the counties of Northumberland, Gloucester and Restigouche have been much closer to the Quebec mills by both water and rail and have been marketing considerably in Quebec during the past twenty years. Northumberland quarries have supplied the major proportion of the Maritime pulp stones used in the Quebec mills.

Notes and Jottings of the Trade

J. F. Ryan, Jr., of the Mastercraft Paper Products Company, New York, was a caller on a section of the Toronto paper trade recently.

The paper board section of the Canadian Pulp and Paper Association held an informal meeting at the Royal York Hotel, Toronto, a few days ago, and talked over matters of interest to the trade. The chairman of the section, K. S. Maclachlan, of the Fraser Company's Ltd., presided over the gathering, which was representative of all the board mills in Canada.

John W. Hewitt, Jr., president of Paper Sales, Ltd., Toronto, has returned from a visit to Price Bros, board mill at Jonquiere, Que., where the firm has recently converted one of its machines to the use of box board. The machine is said to be turning out an excellent line of board, and the company is reported to be busy.

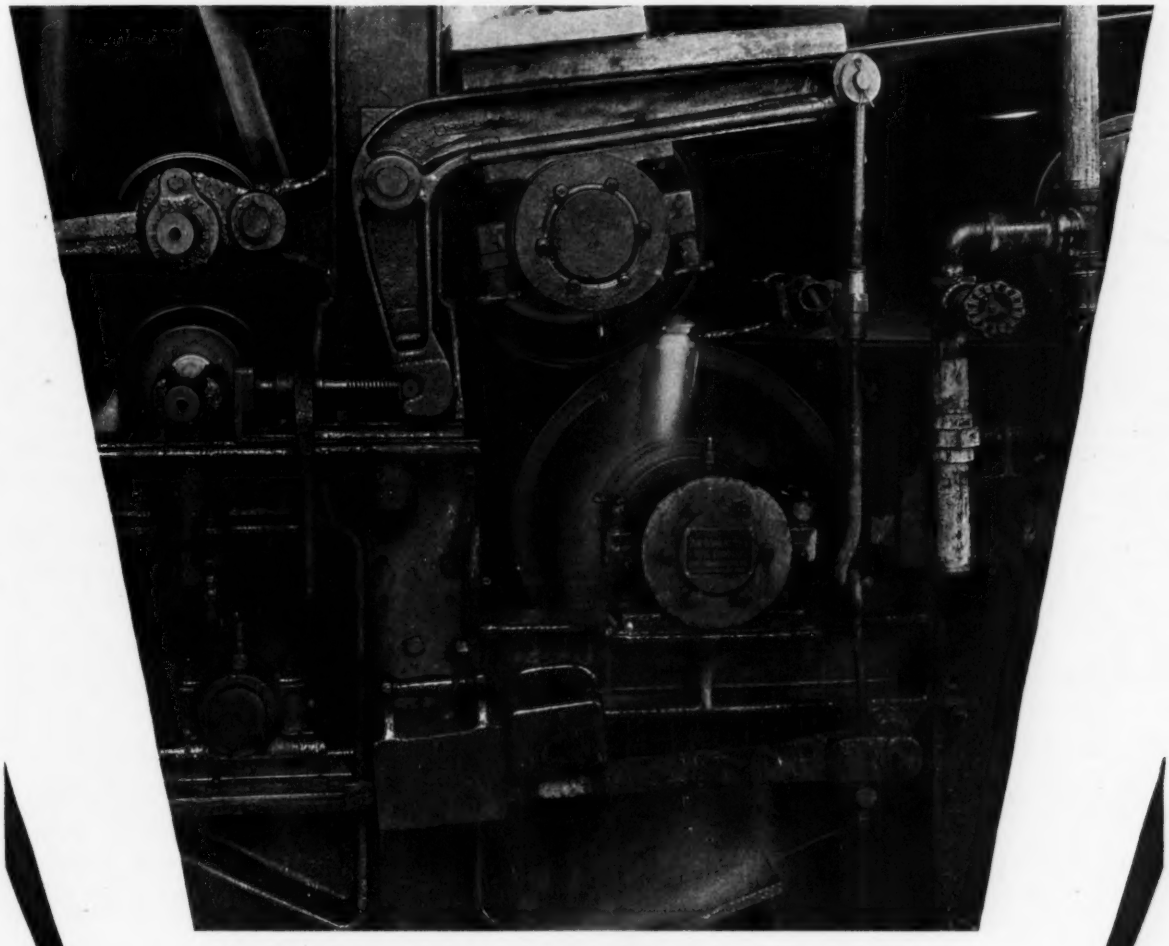
Stewart Clark, manager of the Regina branch of Clark Bros. Winnipeg, called on a few of the Toronto paper merchants last week.

Recent business visitors in Toronto were C. V. Caesar, manager-director of the E. B. Eddy Company, Ltd., and R. H. Ecclestone, sales manager of the Rolland Paper Company, Ltd.

J. Howard Stannard, manager of the International Fibreboard Company, Ltd., is now in Europe arranging increased distribution of Ten-Test Insulating Board, one of the company's products. Mr. Stannard reports encouraging signs of business revival in Great Britain.

The fall in the price of pulpwood is shown by the fact that the Canada Forwarding Company has bought about 6,000 cords of wood at $3.75 a cord at the track at Stavert on the A. C. R. The same wood was bought last year at $6.25 a cord at the spur, according to word from Sault Ste. Marie, Ont.

DOWNINGTOWN



EXTRACTOR ROLL

(PATENTS PENDING)

INCREASES BULK & STRENGTH OF SHEET

After the installation of a Downingtown Extractor Roll on a machine making 16 point test board, the weight of the sheet, per 1000 square feet per point of thickness, was reduced and the Mullen test increased. Another mill using sulphite screenings, for freeing up the furnish to eliminate crushing, found they could cut out 50% of the screenings and still produce the same grade of board. The Extractor Roll removes as much as 2 to 3 lbs. of water per lb. of finished board. It eliminates picking, checking and blowing and produces a firmer sheet with a better finish. The economies of the Extractor Roll in power, steam, felts and increased speed make it a sound investment. We can prove this with facts.

The Downingtown Manufacturing Co., Downingtown, Pa.

Philadelphia Paper Market Seasonally Dull

Business Transacted During Past Week Consisted Mainly of Immediate Orders to Fill Last Minute Holiday Requirements—Demand for Various Grades of Wrapping Paper and Containers Most Active—Book Papers and Twine Continue Very Quiet

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., December 28, 1931—Drifting into a year end lull the Philadelphia paper trade is experiencing the usual late holiday type of market. A slightly firmer tone was noted in the price situation over the immediate holiday period, when dealers found business settling into hand to mouth rush orders of small quantities to meet last minute requirements. On the whole December paper sales were fairly gratifying. These were chiefly of the wrapping paper and container lines to meet the needs of merchants and a few manufacturers in the clothing industries who found rush demands prevailing in belated holiday activity.

Inventory in the local industry discloses that stocks are fairly well cleaned up on standard grades and particularly on those specialties that were in demand when the staple grades were laggards throughout the year. The past year has been a notably important one for the trade in the fact that pre-war values were established and in a few paper grades even lower values made. This has been true of southern kraft which continues to hold to the new low levels. Book papers, too, sold in December at the lowest prices in the post war period.

Building supplies are dull in a characteristic year end lull. Screenings in the cheaper fibers are subjected to a fractional reduction.

Curtis Bros. Combine Sales Offices

With the New Year, the Philadelphia sales offices of Curtis Bros., manufacturers of fine papers, will be discontinued, and the main executive and sales divisions combined in the manufacturing quarters at Newark, Del. The former local sales division in Room 960, Public Ledger Building, which has been operated since the firm gave up its large Quaker City houses and sales offices more than two years ago, are to be abandoned, and the combined sales offices of the Curtis Bros. mills at Newark and Mt. Holly, Pa. are to be merged in the Newark mills. Here will be the sales quarters of the Curtis Bros. representatives, William Hendrie Lloyd, Irwin Megargee, and C. W. Berl, who formerly occupied the Philadelphia offices.

A. Hartung Co. Continues Curtis Lines

Though the Philadelphia direct sales offices of Curtis Bros. have been abandoned under the 1932 business policy, the local paper distributors, A. Hartung Co., 1506 Race street, will continue to carry complete stock of the Curbro lines made by the manufacturers. This will include the book, cover, writing, offset and envelope papers made under that label. The Hartung company is exclusive Philadelphia distributor of the Curtis Bros. mills, having the lines of the Newark and Mt. Holly mills represented in this territory, as agents, ever since the local warehouses were discontinued although the manufacturers continued to occupy direct sales offices here.

Hooper Paper & Twine Co. Expands

Having within the past year or so built up a fine paper division of larger scope, the Hooper Paper and Twine Company, 105 Church street, is planning still broader development in the coming year. The firm installed its own Pedrick Bonds and the Riverdale Covers of the American Writing Paper Company in the current year, in its initial steps towards establishing the fine paper division of its business, long given to wholesaling of wrapping paper and specialties. In the coming year other grades of fine papers will be added, the firm giving its efforts to wholesale distribution of these also, as planned by its head, George K. Hooper.

Paper and Cordage Association Entertains Children

With fifteen firms represented in the attendance, the Philadelphia Paper and Cordage Association held its annual Christmas frolic at the Adelphia Hotel, and this year were hosts to the Salvation Army and its proteges of 26 children. The group met last Friday in the Gold Room, where a large electrically lighted Christmas tree was erected, and where gifts of toys, confectionery and new wearing apparel piled the tables. Following the turkey dinner an entertainment was given the youngsters and then President William Edkin, of the Keystone Cordage Company, in the role of Santa, distributed the gifts from the members. Owing to the holiday festivities, the nomination of officers and routine business was suspended, and the entire session given over to the festivities. The annual election will be held January 15.

Paper Trade Association Meets

The last 1931 quarterly meeting of the Philadelphia Paper Trade Association was held at the Typothetae headquarters last Friday, when a nominating Committee was appointed to name officers for the annual meeting to be held in the coming month. The following were appointed to the nominating committee:—Allen E. Whiting, Whiting Patterson Company; Morgan H. Thomas, Garrett-Buchanan Company; Simon Walter, S. Walter, Inc.; and William A. Hentz, D. L. Ward Company. There were reports on the activities of the body by various committees and the usual business program, with President W. S. Wilcox, presiding.

Miss Mae Hilliard Heads Twine Department

Miss Mae Hilliard, formerly a member of the Park Weikert Company, distributors of twines and ropes until the death of the late head of that concern, and recently associated with Alfred E. Chase in the twine department of the D. L. Ward Company, is now active head of that division. The Ward company will continue to represent the Columbian Rope Company, of Auburn, N. Y., the line formerly distributed by the Weikert company, and after its merger with the Garrett-Buchanan Company on the death of the head of the firm, by the latter concern. Miss Hilliard has had long experience in the twine business with the Weikert company and the Garrett-Buchanan Company, after its merger with that company.

New Papers for West Carrollton Parchment Co.

Charles I. Christman, traveling representative for the West Carrollton Parchment Company, was a visitor in the Quaker City industry introducing the newest lines of that manufacturer in delicatessen specialties. The West Carrollton Parchment Company, West Carrollton, Ohio, has long manufactured vegetable parchment papers and the delicatessen grades include an assortment of popular priced products of good quality to augment the parchments.

1932

"Peace on earth, good will toward men; more business, better business; more paper, and better paper made in your beaters; more beaters; a happier year for everyone."

-Dilts-

MACHINE WORKS Inc. FULTON, N.Y.

"Your Paper is Made in Your Beaters"

Ralph M. Snell Resigns

HOLYOKE, Mass., December 28, 1931—Ralph M. Snell, after twenty-five years' service, has resigned as vice president of the Paper Makers Chemical Corporation. Mr. Snell was born in Marysville, Ohio, November 25, 1876. He moved with his parents when four years old to South Bend, Ind., where his older brothers, Thomas and Bayard Snell, worked for the old Indiana Paper Company. It was at this mill that he obtained his first knowledge of paper making.

Mr. Snell went to Mittineague, Mass., in 1892 where he was employed by the Worthy Paper Company under Robert Harper, superintendent. Later he went with the Chemical Paper Company, of Holyoke, Mass. It was here in 1899 that he met C. H. Knight who was assistant to George

RALPH M. SNELL

Noble, the chemist. Mr. Snell formed a friendship with Mr. Knight that has grown with the years. Mr. Knight with Mr. Noble, formed the Paper Makers Chemical Company to manufacture sulphate of alumina and later rosin size at Easton, Pa.

Mr. Snell became associated with Charles A. and W. H. Upson as superintendent of the Niagara Paper Mills at Lockport, N. Y., and later as manager of the Hartford and Newington Board Mills of P. Garven, Inc. In 1907 he became associated with his old friend C. H. Knight as salesman and service man, in the distribution of ready-made rosin size to the paper mills. Mr. Snell passed with Mr. Knight through the most trying times in the introduction of ready-made size to the mills.

For the Paper Makers Chemical Company he supervised the building and installing of the equipment at the Immaculate Kaolin Mines at Langley, South Carolina for the production of the first air-floated clay for coating paper and other purposes. He next went to Kalamazoo where he supervised the construction of the Western Paper Makers Chemical Company's plant for the manufacture of Satin White and Rosin Size.

He next equipped and started the Paper Makers Chemical Company's Size Plant at Holyoke, and so enlarged the business in New England that it was necessary to build their present plant at Williamsett, which was also built under his supervision.

During the World War he became interested in the company, and with C. H. Knight and C. K. Williams organized the Eastern Paper Makers Chemical Company, and built a size plant at Watertown, N. Y. This company was later merged with the Empire Size and Chemical Company at Albany under the presidency of William Robertson. The plant at Watertown was discontinued, and the business consolidated at Albany, which plant later became a unit of the Paper Makers Chemical Corporation.

He was instrumental in acquiring the Adirondack Mineral Company at Carthage, N. Y., now also a unit of the Paper Makers Chemical Corporation.

In 1921 he went to Europe introducing Paper Makers Chemical Corporation in France, Sweden, Belgium and Denmark, and reopening a market in England. In 1923 with Mr. Knight he formed an organization with H. D. Pochin & Co., Ltd., and under the name of Pochin's & Paper Maker's Chemicals, Ltd., who built a size plant at Erith, Kent, which is now owned by the Paper Makers Chemical Corporation under the name of Paper Makers Chemicals, Ltd.

For the past five years Mr. Snell has edited *Superior Facts*, the house organ of the Paper Makers Chemical Corporation which is widely and favorably known in the paper industry throughout the country. Mr. Snell has always taken a deep interest in the history of paper making and has assembled a large amount of interesting and valuable data which he intends to put in book form so that it may be preserved for easy reference. Outside of this work, he will be otherwise unengaged as he feels he has earned a well deserved rest.

Ross Equipment for Champion Fibre

[FROM OUR REGULAR CORRESPONDENT]

CANTON, N. C., December 28, 1931—The Champion Fibre Company is making some extensive additions to its equipment, in order to insure the continuation of the policy of this Company to make only paper of the highest quality. The J. O. Ross Engineering Corporation is furnishing a complete heating and ventilating system to be used in conjunction with the operation of the 242 inch machine that will make book paper. The production is given as 150 tons in twenty-four hours.

The new heating and ventilating system has been designed to provide for the future addition of air filters and this feature of the design is significant inasmuch as it indicates the careful consideration being given by the Company to the protection of the quality of its product.

The Ross organization is also furnishing a hood for the book paper machine and a complete fan exhaust system. The Hood will be of the Ross Removable Panel Construction that affords easy access to all parts of the machine without interfering with its normal operation at any time, and with the installation of this equipment, the Champion Fibre Company will be in a better position than ever to meet the demand for high quality book paper.

Bids and Awards for Government Paper

[FRCM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 30, 1931—Bird & Son have been awarded the contract for furnishing the Government Printing Office with 40,000 pounds of 25 x 30 laminated binders board at $49.20 per ton. The R. P. Andrews Paper Company will furnish 1,500 sheets of 24 x 36 manila tissue paper at $3.75. Bids for these items were received on December 4.

The Printing Office has received the following bids for 40,000 pounds of No. 2 solid binders board; R. P. Andrew Paper Company, at 3.1 cents per pound; Whitaker Paper Company, 3.1 cents; Consolidated Paper Company, 3.1 cents; and Mathers-Lamm Paper Company, 2.9975 cents.

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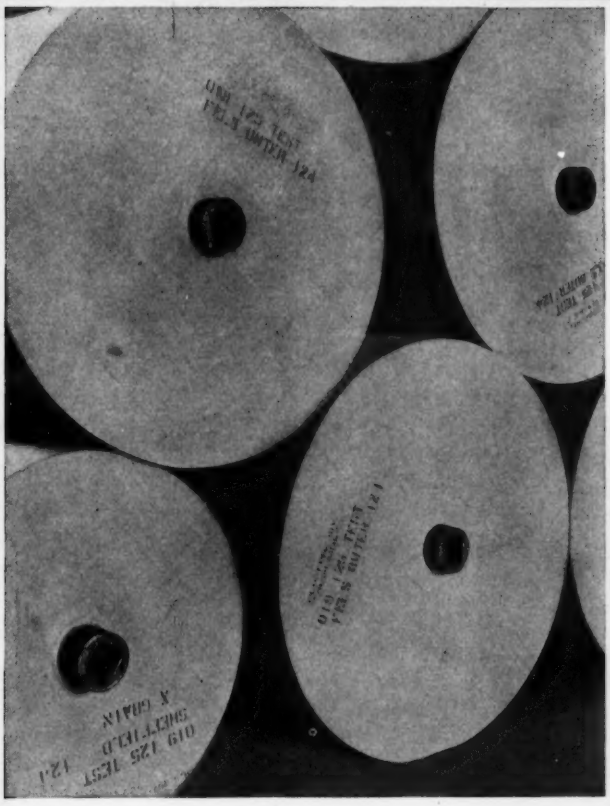

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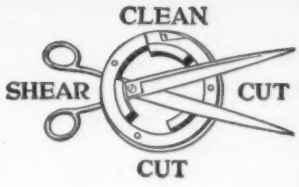

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A SINGLE COURT OF PATENT APPEALS

As the PAPER TRADE JOURNAL has had previous occasion to observe, there is entirely too much needless uncertainty in relation to both the validity and scope of patents. This condition is due in large measure to our present system of appeals in patent infringement suits which is undoubtedly the most inefficient, expensive and wasteful to be found anywhere.

At the present time, the country is divided into ten circuits in addition to the District of Columbia, each of which jurisdictions has a court of appeals. Each of these appellate courts is entirely independent of the others and is supreme within its own jurisdiction. It would seem, therefore, that the eleven courts of appeals could entertain eleven diverse points of view on the validity and scope of a patent and each be correct in its own circuit. Such a condition would be intolerable for both the patentee and the public. If the patentee were fortunate enough to obtain a favorable decision on his patent in one circuit, he would still have to litigate all over again the questions of validity, scope and infringement to enforce his rights against another infringer in another circuit. This process would have to be repeated for each of the eleven jurisdictions in which his patent rights were being violated. In an effort to relieve the patentee of this tremendous burden, the Supreme Court of the United States has indicated in its decisions that it will review a patent infringement suit, provided two courts of appeal have decided the same question concerning the same patent in opposite ways.

This is, however, far from being an adequate solution. Until there are two conflicting decisions, the Supreme Court will not ordinarily consent to review an infringement case and, in the meantime, every patent is surrounded by an indefiniteness and uncertainty which deters the production of inventions and the investment of capital in patents. Until the Supreme Court finally reviews the case, a patent may be valid in one circuit and invalid in another. It may have been given a broad, inclusive interpretation in one circuit and a narrow one in another. It may be infringed by a given construction in one circuit, and not infringed by the same construction in another. A defendant in whose favor a patent has been held invalid, or not infringed, in one circuit, is free to make, use and sell in every other circuit; and the patentee cannot even enjoin his agents or customers. Thus, in a single circuit, a patent may be invalid as to one person or corporation and valid as to every one else, or vice versa. Even if a patent has been sustained in two circuits, there are still nine jurisdictions, any one of which can decide to the contrary; so that the standing of the patent is still in doubt and infringers still may be tempted to take the risk.

A recent illustration of how a patent can spend almost its entire life in the courts before the question of its validity is finally settled is afforded by Patent No. 1,195,923 to Gans, for an apparatus for softening water, owned by the Permutit Company. This patent was issued in 1916 and shortly thereafter became involved in an infringement suit in the Second Circuit (New York). The Circuit Court of Appeals finally held it valid in the case of Permutit Company v. Harvey Company 279 Fed. Rep. 713 (1922). Later, suit was brought against an infringer in Michigan (Sixth Circuit) but the lower court held the patent invalid. The Circuit Court of Appeals of the Sixth Circuit, however, reversed this decision so that the patent was again held valid (Permutit Company v. Wadham 13 Fed. Rep. (2nd) 454 (1926)). Notwithstanding these two Circuit Court of Appeals decisions an infringer in the Seventh Circuit elected to stand suit and succeed in having the patent held invalid by the Circuit Court of Appeals of the Seventh Circuit (Permutit Company v. Graver Corporation 43 Fed. Rep. (2nd) 898 (1930)). Finally, the Supreme Court of the United States consented to review the case and in a decision dated November 23, 1931 held the patent invalid, less than two years prior to its expiration. Hence, during fifteen years of the short life of this patent (seventeen years) neither the patentee nor the public had been in a position to fairly comprehend their rights concerning the patent.

It is apparent that correction of this condition is by far the greatest need of our patent system. Both the patentee and the public, for whose benefit the system was established, are entitled to know early in the life of a patent whether or not it is valid, and what is its scope and these questions should be settled once and for all on the same principles and policy throughout the entire United States. Furthermore, justice demands that the patentee be relieved from the burdens and expenses incident to repeated litigations in different parts of the country.

By far the best proposal that has been brought forward to improve conditions is the establishment of a single Court of Patent Appeals having jurisdiction all over the

United States. Dr. Prindle, chairman of the Patents Committee of the American Engineering Council has drafted a proposed bill to be introduced into Congress. This plan has the approval of the American Engineering Council, The National Association of Manufacturers, The American Institute of Chemical Engineers, The American Chemical Society and the Technical Association of the Pulp and Paper Industry. The Technical Association approved the bill at its fall meeting in Kalamazoo, Michigan, on the recommendation of its patents committee, of which Charles W. Rivise is chairman. Unfortunately, several of the prominent Patent Law Associations and the American Bar Association have come out in opposition to a single Court of Patent Appeals. The reason generally given for this opposition is that "The removal of the hearings on patent appeals from the ten circuits to Washington would work enormous and unjustifiable hardships upon litigants, lawyers, the judiciary, upon the development in the general field of patent law, and would react injuriously to the patent system of the United States and the interdependence of business and industry with the patent system." This argument may more properly be used against the present system than against the proposed change and can hardly be expected to convince a patent owner who has been subjected to the expenses and burdens of finally adjudicating his patent. In view of the opposition of the legal associations, it will be exceedingly difficult, if not impossible, to put the plan across unless the inventors and technical men, through their associations and patent committees, take immediate and concerted action to impress upon their elected representatives in Washington the need for relief from present intolerable conditions. There is no reason why the Technical Association of the Pulp and Paper Industry cannot take the lead in this movement.

Business Is Good With Gilmer

The L. H. Gilmer Company, Tacony, Philadelphia, Pa., manufacturers of V-belts and other types of power transmission belting, has just concluded the regular annual factory conference. Attending this meeting were over fifty men, comprising field salesmen, engineers, and department heads.

During 1931 definite progress has been made in finding increased application for Gilmer products together with a much broader distribution. This has been due to the quality of product, coupled with intensive merchandising methods.

Constructive plans were completed for increased cooperation between the factory and all sales representatives through which it is confidently expected that 1932 will prove to be a year of real achievement.

Andrews Paper Co. Handle Howard Line

The Howard Paper Company, Urbana, Ohio, manufacturers of Howard bond, Howard ledger and Howard mimeograph, announces the recent appointment of The Andrews Paper Company, Boston, Mass., as agents for the complete Howard line. The Andrews Paper Company is one of the outstanding paper distributors in the East, having branches in Springfield, Mass., New Haven, Conn., Providence, R. I., and Portland, Maine.

Unload Swedish Pulp at Albany

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., December 28, 1931—Several thousand tons of Swedish wood pulp arrived at the local port terminal this week for Northern New York mills when three large ocean going vessels arrived here. All reported difficulty in bringing their cargo to this country because of storms and high seas encountered on the trip. The total cargo was estimated to be in the neighborhood of 15,700 tons which is regarded by port officials to establish a new record for the season.

It was also revealed that plans are under way for handling a large movement of wood pulp from Sweden here next spring. This information became known following a conference this week between port officials and representatives of four large importing firms. Several officials from Price, Pierce & Co., Perkins, Goodwin & Co., Anderson & Co., of New York City, and the Union Bag and Paper Corporation, of Hudson Falls, spent the past few days here in order to witness the docking of the foreign vessels and they informed port authorities that they are already making arrangements for next year's importations to this city.

The size of the cargoes taxed all facilities at the terminal to full capacity but all vessels were unloading soon after docking. Another transit depot is now under construction and other arrangements are being made to provide for an increased volume of business. Several hundred stevedores are being steadily employed and the rush of business experienced this week exceeds all other occasions when foreign vessels arrived here. A long line of railroad cars as well as fleets of motor trucks are being used for hauling the cargoes on their final journey to mills in Northern New York.

Boston Paper Trade Happenings

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 28, 1931—Knight, Allen & Clark, Inc., have become the sole New England agents for Ta-Non-Ka Bond, a paper of outstanding value among water-marked sheets, made by the Badger Paper Mills, Inc. This paper is a sulphite bond, manufactured in ten colors and white. A full line of colors, sizes and weights is to be carried in the Boston stock and ready for general distribution about January 1.

Percy D. Wells has issued a "proclamation" in regard to Hornet Linen Bond, a pure white, all rag paper he is handling. This is a paper regarded as a modern equivalent of sheepskin parchment. It is of exceptional strength and durability, essentially a paper for the finest class of stationery and for permanent documentary records, such as contracts, bond certificates, policies and other legal instruments.

Mr. Wells is distributing a calendar which contains all the months of the year on one sheet, and is attractively printed in red and green.

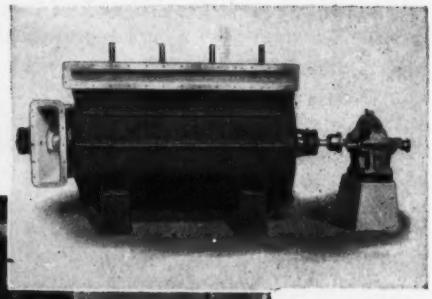
The Deerfield Glassine Company, Monroe Bridge, Mass., has been consummating more business than expected and has a good amount of orders ahead.

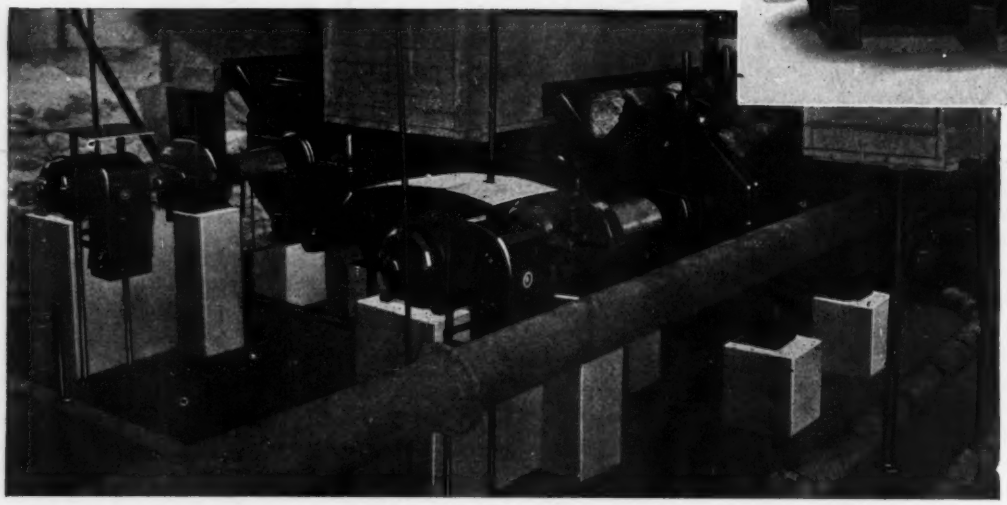
Norwegian Pulp Mills To Benefit

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 30, 1931—The prohibitive duty on paper, with pulp remaining on the free list, will give new impetus to sales of pulp to the British wrapping paper mills, and may in that way benefit Norwegian pulp manufacturers, especially during the winter months when many of the Baltic harbors are closed on account of ice says Commercial Attache Lund at Oslo in a report to the Department of Commerce.

Cut Down SCREEN MAINTENANCE





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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Determination of Pitch in Wood Pulp *

Tentative Official Standard Method of the Technical Association of the Pulp and Paper Industry

The method tentatively proposed for the quantitative determination of pitch in wood pulp has already been published.[1] A copy of this method was sent to eleven different laboratories who had signified their willingness to run cooperative tests for the committee. Each chemist was supplied with samples of bleached and unbleached sulphite and groundwood pulp, respectively, and requested to analyze each sample in duplicate, following the details of the proposed method.

The samples were prepared by taking a large sheet of each pulp and ruling it off into squares. The squares were numbered consecutively and then the sheet was cut up. The squares numbered 1, 11, 21, etc., were sent to the first chemist; those numbered 2, 12, 22, etc., to the second chemist; those numbered 3, 13, 23, etc., to the third chemist; and so on. It was believed that in this way any possible segregation of pitch in the pulp would be counteracted.

* This method has been approved by the Non-fibrous Materials Testing Committee of the Technical Association of the Pulp and Paper Industry. Send suggestions and criticisms to R. C. Griffin, chairman, 30 Charles River Road, Cambridge, Mass.

[1] Paper Trade Journal 88, (Feb. 28, 1929), page 45.

TABLE 1

PITCH DETERMINATION IN PULP

BLEACHED SULPHITE PULP

Chemist	% Ether Extract			% Alcohol Extract			% Total Pitch		
	A	B	Average	A	B	Average	A	B	Average
A	0.94	0.85	0.89	0.36	0.35	0.36	1.30	1.20	1.25
B	.80	.80	.80	.86	.80	.83	1.66	1.60	1.63
C	.626	.673	.649(a)	.204	.245	.22	.83	.918	.87
D	.58	.58	.58	.42(b)	.39(b)	.41(b)	1.00	.97	.98
E	.75	.79	.77	.12	.14	.13	.87	.93	.90
F	.637	.660	.649	.242	.221	.232	.879	.881	.880
G	1.49	1.45	1.47	.17	.25	.21	1.66	1.70	1.68
I	...	...	1.396	...	...	.552	...	...	1.948

UNBLEACHED SULPHITE PULP

A	1.67	1.75	1.71	0.49	0.39	0.44	2.16	2.14	2.15
B	1.53	1.60	1.57	.44	.46	.45	1.97	2.06	2.02
C	1.30	1.41	1.35a	.198	.193	.195	1.498	1.503	1.54
D	1.36	1.36	1.36	.39(b)	.42(b)	.41(b)	1.75	1.78	1.77
E	1.44	1.35	1.40	.24	.29	.27	1.68	1.64	1.66
F	1.272	1.324	1.298	.431	.411	.421	1.703	1.735	1.719
G	.72	.72	.72	.29	.30	.30	1.01	1.02	1.02
I	...	...	1.668	...	...	.666	...	...	2.334

GROUND WOOD PULP

A	0.52	0.53	0.53	1.37	1.41	1.39	1.89	1.94	1.92
B	.52	.50	.51	1.36	1.34	1.35	1.88	1.84	1.86
C	.626	.673	.649(a)	.204	.245	.225	.830	.918	.874
D	.35	.34	.35	1.04	1.14	1.09	1.39	1.48	1.44
E	.26	.33	.30	.43	.38	.41	.69	.71	.70
F	.282	.221	.252	.743	.719	.731	1.025	.940	.983
G	.30	.32	.31	.94	.98	.96	1.24	1.30	1.27
H	.513	.634	.575	.945	.874	.909	1.458	1.508	1.484
I	...	...	1.158	...	...	1.050	...	...	2.208

(a) Chemist C subsequently sent a revised report showing the following figures:

Bleached Sulphite	0.701	0.360	Total 1.061
Unbleached Sulphite	1.61	0.447	2.057
Ground Wood	.63	.98	1.61

Each extraction was carried out for ½ day in Underwriters extractor. The revised figures were obtained with Soxhlet extractor.

(b) By difference.

TABLE 2

COMPARISON OF RESULTS OF (1) DIFFERENT CHEMISTS WITH THE RESULTS (2) OBTAINED ON PORTIONS OF THE SAME SAMPLE ALL RUN BY ONE MAN

BLEACHED SULPHITE PULP

Chemist	Per Cent Ether Extract		Per Cent Alcohol Extract		Per Cent Total Pitch	
	(1)	(2)	(1)	(2)	(1)	(2)
A	0.89	0.89	0.36	0.36	1.25	1.25
B	.80	.95	.83	.37	1.63	1.32
C	.70	.85	.36	.44	1.06	1.29
D	.58	.77	.41	.42	.98	1.19
E	.77	.94	.13	.41	.90	1.35
F	.65	.80	.23	.37	.88	1.17
Average	.73	.87	.39	.40	1.12	1.26
Extreme variation	.31	.18	.70	.08	.75	.18

UNBLEACHED SULPHITE PULP

A	1.71	1.71	0.44	0.44	2.15	2.15
B	1.57	1.58	.45	.63	2.02	2.21
C	1.61	1.52	.45	.55	2.06	2.07
D	1.36	1.51	.41	.53	1.77	2.04
E	1.40	1.60	.27	.62	1.66	2.22
F	1.30	1.61	.42	.54	1.72	2.15
Average	1.49	1.59	.41	.55	1.90	2.14
Extreme variation	.41	.20	.18	.19	.40	.08

GROUND WOOD PULP

A	0.53	0.53	1.39	1.39	1.92	1.92
B	.51	.41	1.35	1.29	1.86	1.70
C	.63	.54	.98	1.39	1.61	1.93
D	.35	.44	1.09	1.32	1.44	1.76
E	.30	.50	.41	1.31	.70	1.81
F	.25	.47	.73	1.37	.98	1.84
Average	.43	.48	.99	1.35	1.42	1.83
Extreme variation	.38	.13	.98	.10	1.22	.23

Eight of the cooperating chemists have sent in their results and these are tabulated in Table 1.

It did not seem possible that the variations in the pitch content found by the different chemists could be due to variation in samples, in view of the way in which the samples were prepared. Nevertheless, it seemed advisable to check this up, and accordingly several of the chemists were asked to return the remainder of their samples. These samples were all analyzed separately in the laboratory of the writer and the results are shown in Table 2.

It will be noted that the results in columns (2), all run by the same man, agree reasonably well. The difference obtained by different analysts therefore would seem to be due to differences in technique. In practically every case, with the exception of the alcohol extract obtained by chemist B on the bleached sulphite, results reported were too low, indicating incomplete extraction.

The method specified that with a Soxhlet extractor the extraction should be continued until the liquid had been siphoned at least ten times; and that with a continuous extractor the extraction should be continued for four hours with the ether boiling rapidly. Most of the collaborators used Soxhlet extractors and it is probable that the rate of siphoning has a considerable effect on the completeness of extraction where a definite number of siphonings is specified. To investigate this point tests were run on each of the

TABLE 3
TIME REQUIRED FOR COMPLETE EXTRACTION

Total Time hours	Ether Extract per cent	Alcohol Extract per cent	Total Pitch per cent
BLEACHED SULPHITE			
2	0.76	0.27	1.03
4	.81	.36	1.17
6	.84	.42	1.26
8	.84	.42	1.26
24	1.04	.46	1.50
(Previous results	.87	.40	1.26)
UNBLEACHED SULPHITE			
2	1.36	0.43	1.79
4	1.42	.52	1.94
6	1.46	.60	2.06
8	1.48	.60	2.08
24	1.53	.64	2.17
(Previous results	1.59	.55	2.14)
GROUND WOOD			
2	0.35	1.15	1.50
4	.41	1.26	1.67
6	.45	1.32	1.77
8	.47	1.33	1.80
24	.53	1.36	1.89
(Previous results	.48	1.35	1.83)

three samples, removing the flask every 2 hours for eight hours and finally at the end of 24 hours, and weighing the extract in each case. The results are shown in Table 3.

The results shown in Table 3 were obtained with a Soxhlet extractor which siphoned about twice per hour. The results indicate that ten siphonings (5 hours) at this speed would not give complete extraction in all cases and that, rather than specifying any minimum number of siphonings, the pulp should be extracted for at least 16 hours.

The following method is recommended as tentative to replace the method previously published:

Preparation of Sample

If the pulp is sufficiently wet, it shall be separated into thin layers and allowed to dry in the air overnight. If the pulp is too dry for this, it shall be soaked in water, then separated into layers and allowed to dry overnight. The layers shall then be cut into pieces about 2 x 4 inches and 5 grams weighed out for each extraction. Pieces shall be creased alternately parallel to the shorter direction so that they may be closed up like a camera bellows. This is very necessary to keep the surfaces apart in the extractor and facilitate rapid extraction. (If preferred, the pulp may be shredded before extraction and packed into the extractor loosely.)

Where extreme accuracy is desired the moisture shall be determined on a separate portion of the air-dried pulp by drying a weighed sample to constant weight at 100-105 deg. C., and the pitch percentages subsequently obtained shall be corrected to the air-dry basis by dividing the actual results by $\frac{1-X}{0.90}$, where X is the percentage of moisture expressed as a decimal. For ordinary purposes, however, the strips dried overnight may be considered in the air-dry condition.

Ether Extract

Five grams of the pulp prepared as previously described shall be placed in a Soxhlet or a continuous extractor, connected to an unweighed Erlenmeyer or Soxhlet flask and extracted with sulphuric ether for at least 16 hours with the ether boiling rapidly.

The ether solution shall be filtered through a wad of absorbent cotton in the bottom of a glass funnel, washing the funnel and the cotton finally with a little ether, and collecting the filtrate in a weighed Soxhlet flask. The solution shall then be evaporated in the flask, the residue dried on the steam bath until the ether is removed and finally dried in the oven at not over 105 deg. C. to constant weight. The weight of residue shall be calculated to percentage of the air-dry pulp and reported as ether-soluble pitch.

Alcohol Extract

After completion of the ether extraction another unweighed flask shall be placed under the extractor and the pulp sample extracted with neutral ethyl alcohol[2] for at least 16 hours in a Soxhlet or a continuous extractor. The alcohol solution shall be filtered through cotton into a weighed flask as previously described, the alcohol evaporated, the residue dried on the steam bath and then to constant weight at not over 105 deg. C. in the oven. The weight of extract shall be calculated to percentage of the air-dry pulp and reported as alcohol-soluble pitch (insoluble in ether).

Note: In the case of sulphite pulp time may be saved by extracting a separate portion of the prepared sample directly with alcohol to obtain the total pitch.

In this case the difference between the percentage of total pitch and of ether-soluble pitch is the alcohol-soluble pitch insoluble in ether.

Total Pitch

The total pitch shall be reported as the sum of the percentages of the ether-soluble pitch and the alcohol-soluble pitch insoluble in ether.

Note: E. Richter[3] was one of the first to call attention to the fact that the pitch in sulphite pulp was completely soluble in alcohol and a portion of it is soluble in ether. He pointed out that by extracting sulphite pulp first with ether and subsequently with alcohol the sum of the two extracts was the same as the total extract obtained by alcohol alone and he further expressed the opinion that it was the ether soluble portion of the pitch that caused the most trouble in paper making. In such cases as the writer has been able to follow through, it has been found that unbleached sulphite pulp causing pitch troubles in making tissue paper showed an ether extract greater than 1 per cent. As there seems to be still some question as to whether it is the total pitch in the pulp or the ether soluble pitch which gives trouble, it seems generally advisable to determine both forms of pitch.

Acknowledgment

The thanks of the Committee are due to the following for their cooperation in analyzing the samples: Bogalusa Paper Company, Forest Products Laboratory, Fraser Companies, Ltd., Hammermill Paper Company, Arthur D. Little, Inc., Marathon Paper Mills, New York State College of Forestry, (Mr. F. C. Peterson), Sutherland Paper Company, and the University of Maine, (Professor Paul DeC. Bray).

[2] Specially denatured alcohol No. 30 may be used.
[3] Chemical Abstracts 1914, p. 2803.

Tensile Strength of Papers Compared

It is probably not commonly realized that the tensile strength range of papers is analogous to that of such materials as tin, zinc, lead, leather, and rope. A review of tensile strength data for papers obtained by the Bureau of Standards, Washington, D. C., during the past ten years, was recently made by the bureau in connection with a study in progress for development of a wear test for paper. The ultimate tensile strength ranges of various types of the papers tested expressed in pounds per square inch for the machine or grain direction of the papers were found to be:

Writing	3,600 to 11,250
Book	3,500 to 5,760
News print	3,130 to 3,930
Wrapping	6,090 to 11,220
Sheathing	2,070 to 4,890

The strength in the cross direction of the papers varied from 26 to 78 per cent of the machine direction strength.

Some tensile strength values of other materials of the order of magnitude of the above values for papers are:

Material	Lbs./in.[2]
Aluminum, cast	12,000 to 14,000
Lead, rolled hard	3,300
Tin, cast	4,000
Tin, drawn hard	10,000
Zinc, drawn hard	10,000
Rubber	510 to 2,730
Leather	1,280 to 7,210
Manila rope	About 10,000

These values are taken from Smithsonian Physical Table 1927, except data for leather which are from International Critical Tables, Vol. II, p. 250.

Some Drier Experiments*

By P. Sandwell[1]

It is the intention of this paper to describe briefly some interesting experiments carried out on paper machine drying cylinders under operating conditions. The experiments were made at a time when a new condensate removal system was being developed, and with the object of proving certain assumptions which had been made in the course of preliminary studies.

It has been stated that at certain speeds, well within the present day paper machine operating range, water within a cylinder will form a film on the inside of the shell, resulting more or less in the insulation of the drier. Since it is necessary however, first of all to impart motion to the water particles so that they could develop the centrifugal force required to hold them against the drier walls, and since this motion could only be imparted by friction between the walls and the particles of water, we doubted whether the formation of a film was possible. Moreover, if the first film could be formed, it would seem that the formation of other films within this first film would be still less likely since the coefficient of friction between particles of water would certainly be even less than between water and the smooth internal surface of the drier.

We understand that an open ended drier had been set up in a machine manufacturer's shop and that at about 1200 f.p.m. a film of water had been observed. We had no knowledge however, of the conditions of the experiment, or as to the smoothness of the inner walls of the cylinder, but it seemed likely that the test was run with cold water, in which case we believed entirely different results might be expected in normal drier operation, with water at comparatively high temperatures and consequently low viscosities.

We also know of an experiment made with a small diameter seamed can, the result of which was cited as being typical of what might be expected in a larger, properly finished cylinder.

The apparatus we used for making the tests consisted of a probe made of ½-inch iron pipe carried through the front or tending end of a drier and projecting radially to within ⅜ inch of the shell. The probe was carried in a stuffing box and could be rotated by hand, an indicator on the outside of the drier showing the angle of the probe within. A test valve was fitted, which when opened indicated the presence of steam or water.

The first tests with this probe were made with the drier operating at a speed of 800 feet per minute, and water was allowed to accumulate during the period of the test. The results obtained were as shown on chart 1. A second test was carried out at a speed of 850 feet per minute, chart 2 showing the results of this test. From these two experiments we felt satisfied in assuming that there would never occur, within the range of speed we contemplated, any carrying over of the water within the drier, and that satisfactory evacuation could be obtained with a syphon system. Incidentally, we have actually operated a syphon system on five foot driers at a speed of 1270 feet per minute without any sign of trouble and without loss of drying capacity, which would seem to prove conclusively that the driers remain clear of water film up to this speed. At any rate the heat transference qualities of the driers were not affected.

After the completion of the installation, a check test was made with a similar probe, and the results shown on chart 3 were then obtained. It will be noted that on this occasion the paper machine was operating at a speed of 960 feet per minute. It will also be noted that in making the final test a greater degree of accuracy was secured by ascertaining not only the points at which clear steam and clear water samples were obtained, but by noting also the portion of the travel of the probe over which a mixture of steam and water was indicated. As a matter of interest a further chart 4 showing the result of similar tests carried out on a slower speed machine, is also included.

Drier Temperatures

The next subject of investigation was that of drier temperatures, and especially the variation of such temperatures across the face of the machine. The first effort in this direction included the installation of a surface pyrometer so mounted as to enable it to be traversed across the face of the drier. Several experimental runs were made, but the results obtained were not reliable enough to justify the drawing of definite conclusions.

The information disclosed by the surface pyrometer indicated the necessity of obtaining more definite knowledge of the behaviour of the drier shell under various conditions, and a more elaborate series of tests was determined upon. For this second series, thermo-couples were installed within the drier shell and the connections brought out through the front drier journals to slip rings, which enabled us to make continuous or alternative readings. Four such thermo-couples were put in, distributed across the face of the drier and buried about ½ inch below the inner surface of the drier shell. The thermo-couple carriers were extended about three inches into the steam space, and four additional thermo-couples were placed so as to make it possible to read not only the shell temperatures, but the steam space temperatures.

A series of tests made at a time when the condensate valve was held open and the drier clear of water indicated very considerable variations of shell temperature. Towards the rear of the drier, between the steam inlet and the condensate pipe, temperatures of 295 deg. F. were recorded, while at the front of the drier the temperatures of 266 degrees. The saturated steam temperature was at the time 267 deg. F. but more than 50 degrees of superheat was being carried. It was obvious that the comparatively rapid circulation of steam from inlet to discharge caused a zone of very high temperatures towards the rear of the drier.

We then closed the condensate valve and allowed water to accumulate in the drier. After 30 minutes, in which time we would expect say two or three inches of condensate to collect, the test was reported. We still had the highest reading at a point near the syphon pipe, but the temperature was within six degrees of the saturated steam temperature, while the lowest reading was only 2½ degrees below the steam temperature.

Comparing the two tests then, we find that with the drier operating under the "blow through" system we had a total temperature variation of nearly 30 deg. F. Under the sealed system, the variation was only 7½ degrees, and the difference between the lowest temperatures, which after all control the capacity of the drier, was only 1½ deg. F. We were satisfied that we could carry several inches of water in the drier without affecting its heat transference capacity, and that we could obtain thus practically even temperatures clear across the face of the machine.

We found also that so long as one prevented the rapid circulation of steam, superheat had no ill effect. The comparatively small amount of heat carried by the steam as superheat is very easily given up to the blanket of wet steam which lies in contact with the shell during operation.

As to the contention that the drier capacity will be lowered by the presence of a small quantity of water within it; we can state positively that the condensate discharged from driers operated in this manner is within a few degrees of the temperature corresponding to the steam pressure carried. The water at the bot-

* Presented at the fall meeting of the Pacific Section of the Technical Association of the Pulp and Paper Industry, Powell River, B. C., Oct. 23, 1931.

[1] Member TAPPI, resident engineer, Powell River Company, Ltd., Powell River, B. C.

tom of the driers is in a constant state of agitation and is imparting heat to the drier shell as freely and as rapidly as the steam from which it is formed.

The primary condition we had in mind in designing the new system was economy of steam usage, which we proposed to attain by assuring complete condensation of the steam used within the drier, and the control of the discharge valve in such a way as to prevent the evacuation of steam. It was at least gratifying to find that in doing this we were improving the drier operation.

Evacuation of Non-Condensible Gases

The third series of experiments which this paper is intended to deal with was concerned with the evacuation of noncondensible gases from the driers, especially during periods of starting up. The apparatus in this case consisted of a probe similar to that used in the tests made to ascertain the location of water within the drier, except that the valve instead of discharging to atmosphere, controlled the discharge of the gases to a condenser. The gases after passing through this condenser were discharged to a closed vessel, condensate itself being measured as it flowed from the vessel.

Previous experiments made with a view to determining the accumulation of hydrogen within the driers had shown that although there was absolutely no evidence of stratification, higher concentrations occurred in the lower part of the drier, and the probe was therefore fixed so as to take samples continuously from this location.

The tests were made after the installation of the condensate system to which reference was previously made, and in the first case the machine was started up in the normal manner with the condensate system working normally and discharging condensate as it accumulated. No attempt was made to clear the driers by the use of the air valve on the front journal, and the only vent for air, etc. was made by the pilot pipe of the condensate system. The chart A-4124 shows that about 40 minutes elapsed from the time steam was originally admitted to the driers to the time at which the first clear indication of steam occurred. The concentration of gases then very rapidly decreased and within 90 minutes after the time of first admission of steam, had reached negligible proportions.

In the second experiment, results of which are shown on chart A-4125, the air valve on the front end of the drier was opened for 10 minutes after the first admission of steam, this being the usual practice on these machines. The curve shows the difference made by this 10 minutes free vent of gases. The time required to clear the driers of a sensible accumulation of gases was reduced to about 40 minutes.

In order to stand up the starting of the machines, we had de-

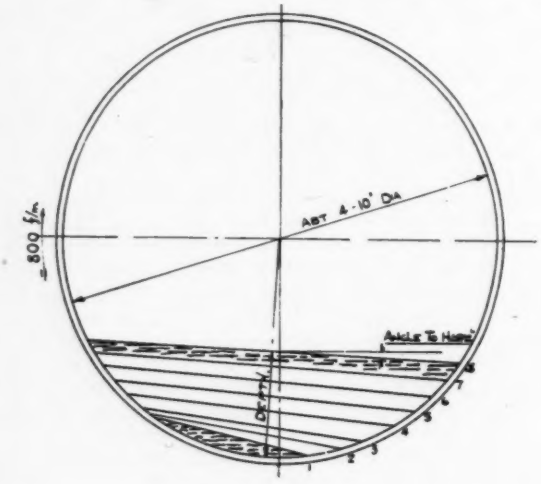

FIG. 1

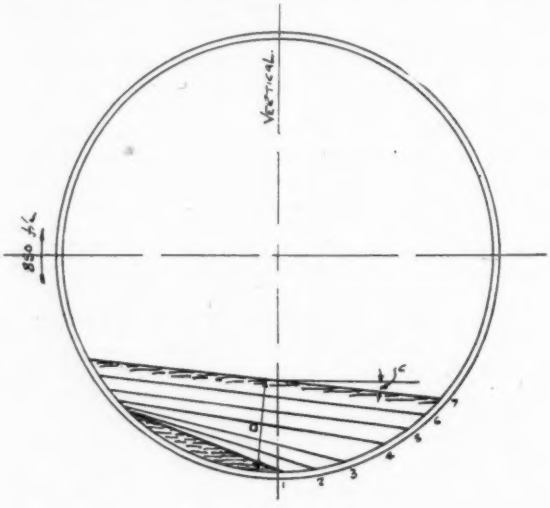

FIG. 2

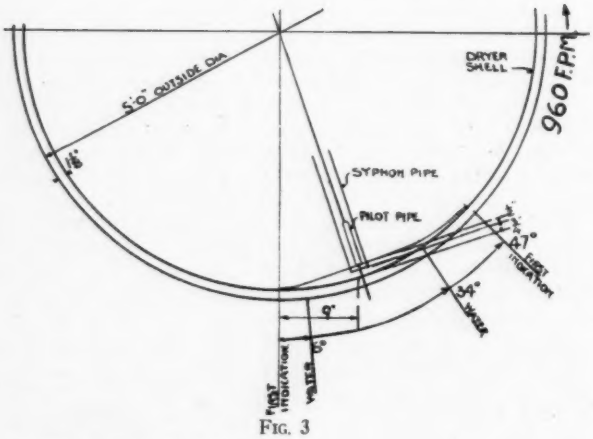

FIG. 3

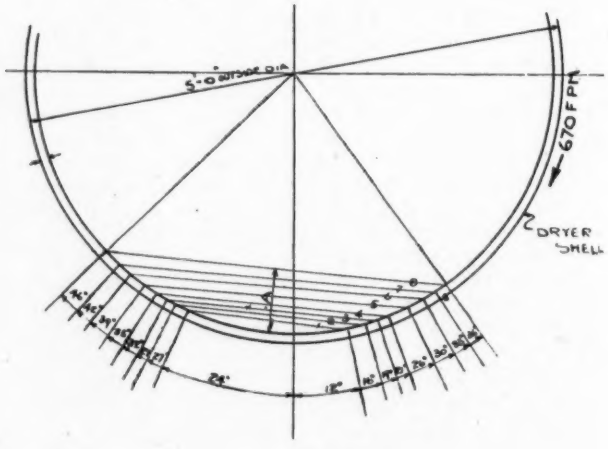

FIG. 4

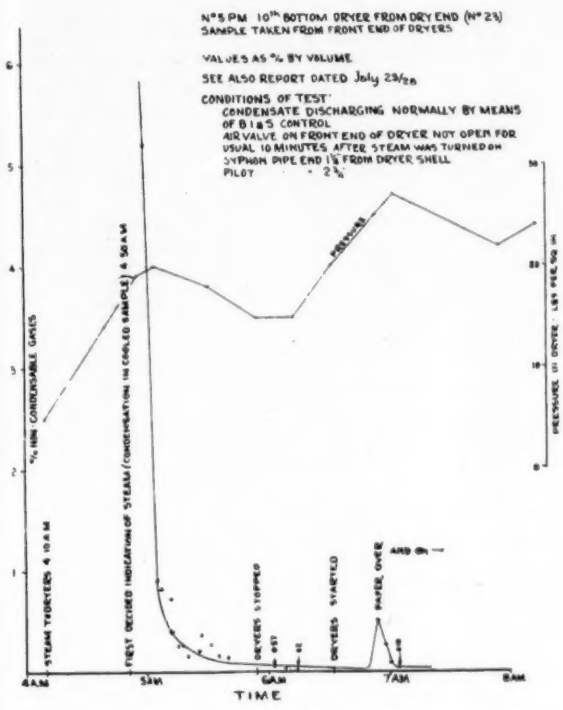
N°5 PM 10th BOTTOM DRYER FROM DRY END (N°23)
SAMPLE TAKEN FROM FRONT END OF DRYERS
VALUES AS % BY VOLUME
SEE ALSO REPORT DATED July 23/28
CONDITIONS OF TEST:
CONDENSATE DISCHARGING NORMALLY BY MEANS OF B I & S CONTROL
AIR VALVE ON FRONT END OF DRYER NOT OPEN FOR USUAL 10 MINUTES AFTER STEAM WAS TURNED ON
SYPHON PIPE END 1¼ FROM DRYER SHELL
PILOT " 2¾ "
% NON CONDENSABLE GASES
PRESSURE
PRESSURE IN DRYER - LBS PER SQ IN
STEAM TO DRYERS 4.10 A.M
FIRST DECIDED INDICATION OF STEAM (CONDENSATION IN COOLED SAMPLE) 4.50 A.M
DRYERS STOPPED
DRYERS STARTED
PAPER OVER
AND ON —
4 AM
5 AM
6 AM
7 AM
8 AM
TIME

FIG. 5

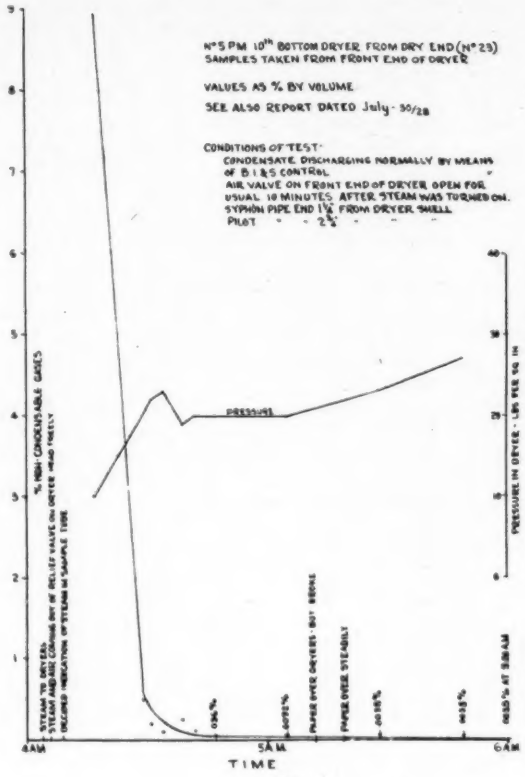
N°5 PM 10th BOTTOM DRYER FROM DRY END (N°23)
SAMPLES TAKEN FROM FRONT END OF DRYER
VALUES AS % BY VOLUME
SEE ALSO REPORT DATED July 30/28
CONDITIONS OF TEST:
CONDENSATE DISCHARGING NORMALLY BY MEANS OF B I & S CONTROL
AIR VALVE ON FRONT END OF DRYER OPEN FOR USUAL 10 MINUTES AFTER STEAM WAS TURNED ON.
SYPHON PIPE END 1¼ FROM DRYER SHELL
PILOT " 2¾ " "
% NON CONDENSABLE GASES
PRESSURE
PRESSURE IN DRYER - LBS PER SQ IN
PAPER OVER DRYERS BUT BROKE
PAPER OVER STEADILY
4 AM
5 AM
6 AM
TIME

FIG. 6

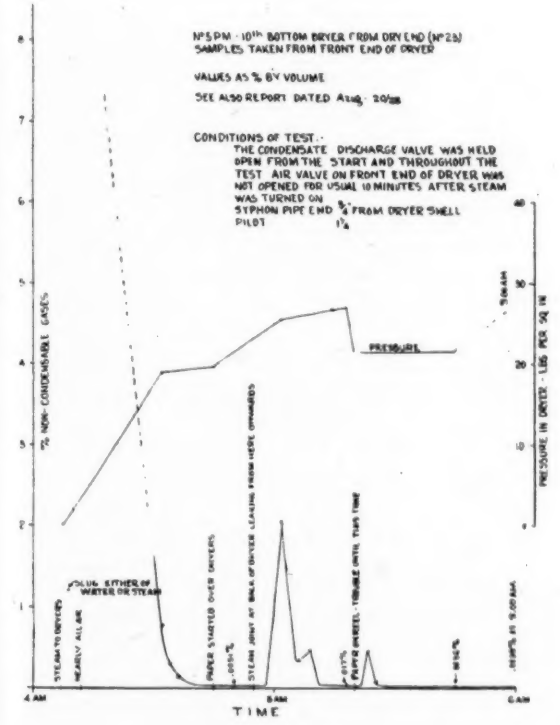
N°5 PM 10th BOTTOM DRYER FROM DRY END (N°23)
SAMPLES TAKEN FROM FRONT END OF DRYER
VALUES AS % BY VOLUME
SEE ALSO REPORT DATED Aug 20/28
CONDITIONS OF TEST:
THE CONDENSATE DISCHARGE VALVE WAS HELD OPEN FROM THE START AND THROUGHOUT THE TEST. AIR VALVE ON FRONT END OF DRYER WAS NOT OPENED FOR USUAL 10 MINUTES AFTER STEAM WAS TURNED ON
SYPHON PIPE END ¾ FROM DRYER SHELL
PILOT " 1¼ "
% NON CONDENSABLE GASES
PRESSURE
PRESSURE IN DRYER - LBS PER SQ IN
PAPER STARTED OVER DRYERS
PAPER WRECKED - TROUBLE OVER THIS TIME
4 AM
5 AM
6 AM
TIME

FIG. 7

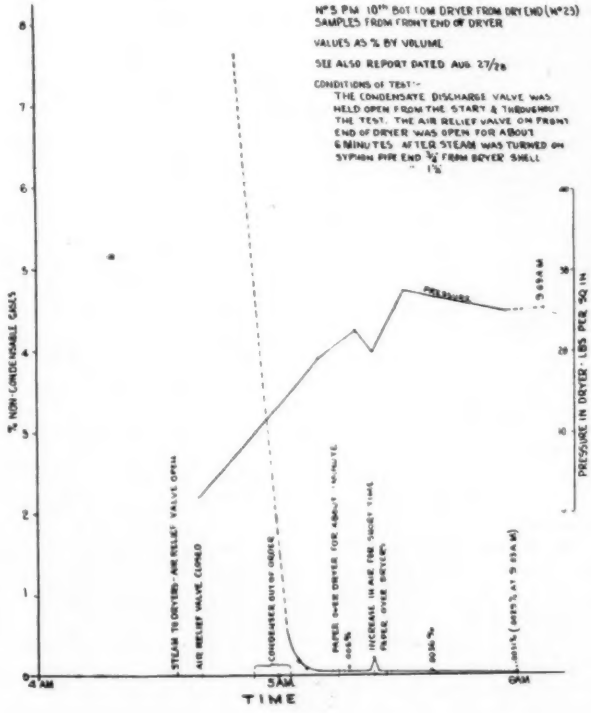
N°5 PM 10th BOTTOM DRYER FROM DRY END (N°23)
SAMPLES FROM FRONT END OF DRYER
VALUES AS % BY VOLUME
SEE ALSO REPORT DATED Aug 27/28
CONDITIONS OF TEST:
THE CONDENSATE DISCHARGE VALVE WAS HELD OPEN FROM THE START & THROUGHOUT THE TEST. THE AIR RELIEF VALVE ON FRONT END OF DRYER WAS OPEN FOR ABOUT 6 MINUTES AFTER STEAM WAS TURNED ON
SYPHON PIPE END ¾ FROM DRYER SHELL
1¼ "
% NON CONDENSABLE GASES
PRESSURE
PRESSURE IN DRYER - LBS PER SQ IN
STEAM TO DRYERS - AIR RELIEF VALVE OPEN
AIR RELIEF VALVE CLOSED
CONDENSATE OUT OF DRYER
PAPER OVER DRYER FOR ABOUT 1 MINUTE
INCREASE IN AIR FOR SHORT TIME
PAPER OVER DRYERS
4 AM
5 AM
6 AM
TIME

FIG. 8

signed auxiliary equipment so that when the driers were cold, and for a short period after the admission of steam, all of the condensate valves would remain open, allowing free blow through of condensate and gases, and the test which is covered by A-4126 was made during a normal start up, but with the condensate system operating in this manner, no assistance being given by the use of the air vent. The very rapid evacuation of noncondensible gases obtained in this way is clearly shown, and in the test, the driers were practically clear inside of 30 minutes.

Similar conditions prevailed during the test shown on A-4127, except that we gave the driers some relief through the air valve, in addition to the relief obtained through the condensate system. There was no noticeable difference in the time taken to clear the driers, and it seemed obvious that the opening of the condensate valves effected the clearing process about as rapidly as was possible, and that if this scheme were adopted the use of the air vents could be discontinued.

The experiments are interesting as showing the time required tc get rid of the air from the driers when starting up from the cold. Under normal operating conditions, however, the advantages of slow steaming so as to avoid drier strains, are such that the additional time which is spent in clearing the driers of air is of comparatively small consequence.

On mid-week shutdowns however, when a machine is normally operating at extremely low pressures, negative pressures may easily be formed within the driers when the steam is closed off, and with the average type of drier joint, these negative pressures induce an inward flow of air. The advantages then to be obtained by the rapid evacuation of this air and noncondensible gas are quite considerable, and seemed to justify the development of this feature of our condensate removal system.

A.S.M.E. Printing Industries Division Plans

New officers for 1932 have been chosen at a meeting of the Executive Committee of the Printing Industries Division of The American Society of Mechanical Engineers. George C. Van Vechten, superintendent of the Stecher Lithograph Company, Rochester, N. Y., was named chairman, succeeding Arthur C. Jewett, director of the College of Industries, Carnegie Institute of Technology, Pittsburgh, Pa. Edward Pierce Hulse, printing engineer, New York, N. Y., was named secretary, succeeding Walter E. Wines, manager of the Mechanical Department, American Newspaper Publishers Association, New York, N. Y. Floyd E. Wilder, Mechanical Research, Hearst Publications, New York, N. Y., was elected to the five-year term on the Executive Committee, succeeding Frederick M. Feiker, Department of Commerce, Washington, D. C. The three other members of the Executive Committee are Arthur C. Jewett, Pittsburgh, Pa.; William Clement Glass, U. P. M.-Kidder Press Company, New York, N. Y.; and John Clyde Oswald, managing director, New York Employing Printers Association.

The association advisory members of the committee are George H. Carter, the Public Printer of the United States, Washington, D. C.; Edward Epstean, president of the Photo-Engravers Board of Trade of New York; Frederick M. Feiker, director of the Bureau of Foreign and Domestic Commerce, Washington, D. C.; Ronald G. Macdonald, secretary of the Technical Association of the Pulp and Paper Industry, New York, N. Y.; Joseph M. Farrell, Mechanical Committee, American Association of Advertising Agencies, New York, N. Y.; Fred S. English, chief engineer of the Babcock Printing Press Manufacturing Company, New London, Conn.; Burt D. Stevens, first vice-president of the Miehle Printing Press and Manufacturing Company, Chicago, Ill. The foregoing are all members of the A.S.M.E.

The Divisional Committees, with their chairmen, are as follows: Meetings and Programs, Floyd E. Wilder (succeeding Otto W. Fuhrmann); Research and Survey, Arthur C. Jewett; Progress Report, Winfield S. Huson; Paper and Pulp, William D. Maull. The Pan-Graphic Committee was discontinued, its work being absorbed by the Meetings and Programs Committee.

The plans for the Third Conference of the Technical Experts in the Printing Industry are practically completed, and the committee will soon announce the complete list of speakers and features. This will be held in New York City on Monday and Tuesday, March 14 and 15, 1932, the McGraw-Hill Publishing Company being the host in their new forty-story building at 42d Street and Ninth Avenue. The banquet will be on Monday night at the Hotel Astor.

The New York Club of Printing House Craftsmen has changed its regular meeting date from March 17th to March 15th, which will be the last day of the Technical Conference. The Craftsmen are planning on taking an active part in the conference and will extend an invitation to all those attending, to join in their dinner on Tuesday night, at which time they have invited one of the prominent A.S.M.E. members as a speaker. They will also have a Reception Committee on hand at all times to look after the out-of-towners.

Research on Preservation of Records

A summary of the progress made at the bureau in studies of the preservation of written and printed records is contained in a report recently issued by the Bureau of Standards, Washington, D. C.

Thorough tests of the relative permanence of the current commercial writing and printing papers have been completed. The tests indicate there are papers made from both rag and wood fibers that are suitable for any required degree of permanence, providing the papers are stored under favorable conditions. A suggested classification of papers relative to the varying degrees of permanence required, graded them according to their degree of cellulosic and non-cellulosic purity as this is apparently the significant factor in respect to deterioration.

Tests have been made also of over a thousand old publications that have been stored in public libraries for varying periods during the past one hundred years. These tests like those of the current papers reveal the importance of fiber purity. Papers containing crude fibers such as ground wood and unbleached fibers were generally brittle and yellow while those containing fibers well purified by chemical treatment, were generally in good condition.

The results of a survey of public libraries and similar depositories in various regions of the United States indicated the chief external deteriorating influences to be acid pollution of the atmosphere, particularly sulphur gases from combustion of fuels, high temperatures, variations in atmospheric humidity, light and dust. Laboratory studies of these influences have been initiated.

The report was published in the October issue of the Library Quarterly and reprints of it are available at the bureau.

TAPPI Annual Meeting

The Alkaline Pulping Committee of the Technical Association of the Pulp and Paper Industry, under the chairmanship of E. S. Hinman of the P. H. Glatfelter Company, has announced that three or more papers will be presented in its meeting on February 17, 1932. These include, "An Alkaline Recovery Review," by C. L. Wagner; "Deinking of Book Paper," by H. A. Morrison; and "Notes on the Operation of Continuous Caustic Recovery Plants," by W. E. Piper.

The Materials of Construction Committee of which J. D. Miller of the York Haven Paper Company is chairman, has announced the following papers to be presented at the committee meeting in February: "Service Records of Some Materials in the Paper Industry," (a committee survey), "Alloy Steel in the Sulphite Industry," by Andreas Christensen of the Rhinelander Paper Company; "Effect of Alkaline Liquors on Some Alloys," by G. H. McGregor; "Developments in Alloy Cast Iron for the Paper Industry," by F. L. La Que and J. S. Vanick; and "Rubber Covered Rolls, Construction and Uses," by E. Peterson.

Current Paper Trade Literature

Abstracts of Articles and Notes of Papermaking Inventions Compiled by the Committee on Abstracts and Bibliography of the Technical Association of the Pulp and Paper Industry

Clarence J. West, Chairman

For photostatic copies of articles appearing in the Abstract Section, address the chairman of the Abstracts Committee, Dr. Clarence J. West, National Research Council, 21st and B Streets, Washington, D. C. The charge for this service is: Photostats 9 x 11 inches, 18 cents each; 18 x 11 inches, 35 cents each; 22 x 18 inches, 70 cents each; minimum charge, 50 cents. Payment should be made upon receipt of invoice. Copies of United States patents may be obtained from the U. S. Patent Office, Washington, D. C., for 10 cents each. Send currency not stamps.

Machinery

Sectional Electrical Paper Machine Drive. Edward H. Horstkotte, assignor to General Electric Co. U. S. pat. 1,805,486 (May 19, 1931).—Each section is driven by a direct current separately excited shunt motor, the armature of each of which is supplied from an independent generator. The field circuits of the several generators are supplied from a common adjustable source of excitation, and the shunt field windings of the sectional motors are supplied from a common constant source. The speed of the drive as a whole is varied by varying the excitation of the generators supplying the sectional motors. The speed of each sectional motor is controlled by means of a rheostat in the field circuit of the corresponding generator, which in turn is controlled by a speed regulator of the synchronous dynamometer type mounted on the intake shaft of the paper-machine section. The sections are tied in by a master set comprising a master generator excited in proportion to the voltage of the source of excitation of the sectional generators and a master motor-generator set supplied thereby for supplying a reference frequency to the stator of each of the sectional regulators.—A. P.-C.

Multiple Generator System of Control for Paper Machines. H. W. Rogers. Paper Trade J. 93, No. 14: 47-50 (Oct. 1, 1931).—A brief exposition of this type of drive, showing its development and bringing out the flexibility of electrical equipment in meeting successfully the ever increasing demands of the paper industry.—A. P.-C.

Electrical Multiple Motor Drive for a Yankee Machine. W. Kuhl. Papier-Fabr. 29, No. 23A: 106-112 (June, 1931).—After a short introduction concerning the work of a Yankee machine, the author gives the disadvantages of the transmission drive of these machines. Four motors are necessary for the variable part of the machine, the couch, the wet press, the drying cylinder and the winder. The operation and construction for these motors are discussed along with their methods of control. An example is given showing the economic advantages of the multiple drive.—J. F. O.

Recent Innovations in the Multiple Motor Drive for Paper Machines. E. Richter, Papier-Fabr. 29, No. 23A: 103-106 (June, 1931).—The author describes the recent devices for the regulation of multiple motor drives for paper machines, especially that made by the Bergmann Elektrizitatswerken. The construction, operation and advantages of multiple drives with mechanical differential and synchronous control systems are discussed.—J. F. O.

Apparatus for Controlling the Moisture Content of Paper on the Paper Machine. Albert Allen and John G. Callan assignor to Atlantic Precision Instrument Co. U. S. pat. 1,805,474 (May 19, 1931).—A moisture sensitive device is exposed in close proximity to the sheet, preferably after it has passed through the calenders. The device consists of viscose threads, anchored at one end and attached at the other to the upper end of one plate of a vertical book type electrical condenser, the lower end of the plate being provided with a knife edge bearing element which is pressed against an angular seat member. The free end of the movable plate is yieldingly pressed toward the stationary plate of the condenser by means of springs. The movable plate is grounded and the stationary plate is connected to a radio frequency apparatus which greatly multiplies the response to change of moisture of the hygrometric element. The radio frequency apparatus is made to control admission of steam to the driers so as to maintain the moisture content of the finished paper constant.—A. P.-C.

Top Screen for Wood Pulp Digesters. Einar Morterud. U. S. pat. 1,810,845 (June 16, 1931).—The screen plate in the top of the digester is provided with a number of auxiliary overflow openings made in the form of short vertical tubes, with the upper ends preferably inclined. If the normal screen openings become clogged, the liquid level on the screen rises and the surplus liquid flows through the overflow tubes into the body of the digesters. The overflow tubes have a considerably larger area than the ordinary screen holes, so that they are not liable to become clogged.—A. P.-C.

Directly Heated Pulp Digester. Einar Morterud, U. S. pat. 1,807,544 (May 26, 1931).—Heating is effected by injecting steam into the digester through a number of openings located at different levels over the middle or cylindrical part of the digester. Each steam inlet may be covered by a sloping screen which may be perforated in order to keep pulp away but allow the liquor to pass, the steam thus coming in immediate contact with a considerable volume of liquor without striking the stationary pulp fibers.—A. P.-C.

Device for Charging Digesters. Werner Scholz and Arno Frohberg. U. S. pat. 1,813,205 (July 7, 1931).—The device consists of a closed annular tube which can be placed in the neck of the digester. Two circularly disposed sets of nozzles are provided in the tube to deliver compressed fluid (preferably steam) near the bottom of a conical baffle plate suspended from the lower portion of the annular tube. An auxiliary set of nozzles is provided in a hollow steam head suspended below the main conical baffle plate; and the jets from the auxiliary nozzles strike and auxiliary conical baffle plate, and the two sets of deflected steam jets meet at a point inside the digester. The liquor may be introduced through a sprinkling head suspended below the auxiliary conical baffle plate, so as to accelerate the condensation of the steam and prevent the building up of undue counter pressure in the digester.—A. P.-C.

Screen Used for Chopped Straw With a Shaking Arrangement and Blower Device. Ernst Grumbach & Sohn A. G. Ger. pat. 516,120 (May 16, 1926). Between the two shaker screens, a blower is arranged of such a size that the large chips and knots fall, the lighter materials are blown away and the regular sized chips go onto the following screen. J. F. O.

Revolving Suction Roll With An Inner Stationary Suction Chamber for Paper Machines and Similar Apparatus. Alois Danninger, Steyermuhl. Czechoslovakia pat. 33,377. A slit is arranged between the inner surface of the mantel of the suction cylinder and the suction chamber, which prevents a direct contact of the inner surface of the suction cylinder with the suction chamber. Pipes for the liquid are arranged in the suction chamber which open to the slits between the suction cylinder and the suction chamber through openings in the wall of the suction chamber. J. F. O.

Apparatus for Use in Finishing Paper. Stuart W. Webb, John G. Callan and Albert Allen assignors to Eastern Manufacturing Co. U. S. pat. 1,804,483 (May 12, 1931).—The patent relates to the construction of the steam box used for humidifying paper to which a fabric surface is to be imparted by passing it between two endless fabric belts through the nip of a press. The steam box comprises an outer casing, preferably made of waterproofed wood, inside which is a metal lining formed of a pair of plates bowed upwardly at their lower ends and with their upper ends converging towards the outlet opening for the paper. The lining is spaced from the casing proper and terminates somewhat short of the ends of the casing to permit circulation of steam between the casing and lining, thus preventing condensation of steam inside. Within each of the bowed lower portions of the lining plates is a steam distributing pipe extending longitudinally of the casing, so as to bring steam into contact with both sides of the paper as it passes vertically upwards through the steam box. In order to prevent drip of condensed steam reaching the paper, the entrance and exit openings for the paper are partially closed off by longitudinal steam-heated pipes with which the paper comes in contact to practically seal the openings.

Mounting for Non-Driven Rolls. Gunnar Wistrand assignor to Aktiebolaget Svenska Kullagerfabriken. U. S. pat. 1,804,909 (May 12, 1931).—The patent covers a mounting for non-driven rolls comprising a funnel-shaped bearing housing resting with its narrow part in a support and fixed to a stationary axle passing through the roll, and an antifriction bearing mounted with its outer race in the housing inward of the support and having its inner race mounted on the neck on the end of the roll.—A. P.-C.

Suction Roll. Edward T. Street assignor to Downington Manufacturing Co. U. S. pat. 1,812,812 (June 30, 1931).—The chief objects of the invention are to provide an adjustment of suction roll packings so that they will make proper engagement with the shell and be adjustable while the roll is in operation and also to provide for removal of the packing without dismantling of the roll. The suction box, which is in the form of a U-shaped trough, is provided on its sides with a multiplicity of springs which hold the packing against the inside of the roll shell. The action of the springs and the pressure of the packing against the inside of the shell wall can be adjusted by turning a shaft on which is mounted an eccentric.—A. P.-C.

Countersunk Suction Roll Shell. William H. Millspaugh assignor to The Paper and Textile Machinery Co. U. S. pat. 1,805,780 (May 19, 1931).—The holes in the shell of the suction roll are countersunk, the inner ends of the holes being circular while the outer ends are considerably larger and substantially square. The outer square edges of adjacent holes lie close together, so that the outside of the shell presents a net-like surface for supporting the wire covering of the roll. In this way the effective suction area of the roll is greatly increased without appreciably weakening the shell.—A. P.-C.

Drier Felt. Thomas Hindle. U. S. pat. 1,812,148 (June 30, 1931).—An improved drier felt comprises a working face wholly of worsted warp yarns coarser and thicker than the back cotton warp yarns, a back of cotton warp yarns finer and thinner than the worsted face yarns and a weft wholly of cotton yarn finer than the worsted warp yarns constituting a dense or crowded worsted face of warp yarn for the working face and an open or porous cotton back.—A. P.-C.

Calender Roll Weight Nomograph. D. S. Davis. Paper Ind. 13,859 (Oct., 1931).—A nomographic chart is given for finding the approximate weight, in tons, of a calender roll when the length of face, in inches, and the diameter of the roll, in inches, are known.—A. P.-C.

Wiper or Cleaner for Dandy Rolls. Peter S. Sinclair. U. S. pat. 1,814,864 (July 14, 1931).—The roll is mounted on a stationary, hollow shaft which is provided with openings through which water is sprayed outwards through the covering of the roll to remove adhering particles of stock. A suction box contacts with the outer surface of the roll at the point where the sprays pass through.—A. P.-C.

Felt Conditioner. Lawrence W. Case. U. S. pat. 1,815,237 (July 21, 1931).—In this invention there is provided a steam chest for conditioning felts. The felt is subjected to hot vapor while it is in motion and before it reaches the press or drier rolls, so that the felt is opened up, cleaned and heated; and the heat is transferred indirectly by the felt to the web of paper previous to its passage through the press rolls.—A. P.-C.

Apparatus for the Production of Paper Glazed and/or Colored on One Face. Victor Antoine. U. S. pat. 1,818,982 (Aug. 18, 1931).—Color solution is applied to one side of machine-glazed paper made on a Yankee machine by means of a distributor located ahead of the drier. Between the drier and the distributor a roll lies across the width of the sheet to form a pool of coloring solution and distribute the latter uniformly over the surface of the sheet. The distributor is fed from a regulator which ensures that the solution flows from the distributor under a constant head.—A. P.-C.

Improvement in Calender Rolls. François André Goyot. Fr. pat. 709,438 (April 15, 1930).—The lower roll is provided with a number of electro-magnetic elements having their poles at or near the periphery of the roll, so that the magnetic circuits are completed by the upper roll. The pressure between the rolls is thus exerted by the attraction of the upper roll by the lower one, and no additional mechanical pressure-applying devices are necessary. The pressure can be regulated by varying the energizing current by means of an outside rheostat.—A. P.-C.

Wires, Rolls and Felts in Paper Making. Anon. World's Paper Trade Rev. 96: 1052, 1054 (Sept. 25, 1931).—Brief practical hints on their care and upkeep.—A. P.-C.

Dandy Rolls. Peter Sinclair. Paper Mill 54, No. 40: 22-24 (Oct. 3, 1931).—A brief outline of the development of modern dandy rolls, together with a discussion of the qualities required of dandy rolls and a brief description of the process used in making the watermarks placed on dandy rolls.—A. P.-C.

Watermarking Device. Ira T. Fisk assignor to Stevens and Thompson Paper Co. U. S. pat. 1,808,536 (June 2, 1931).—The method consists in heating the limited areas of paper which form the design to a much higher degree than the surrounding areas and applying pressure to iron the design into the paper. The web, as it is carried by the top drier felt, passes between the marking roll and a platen roll. The marking roll carries in relief the desired design which is at least 0.075 inch or more above the general surface of the roll. The marking roll is steam heated so that it is at practically the same temperature as the drier rolls. The invention is particularly suitable for creped paper, but is applicable for marking any kind of paper.—A. P.-C.

Process for Sizing Paper. Ernest Lecoq. U. S. pat. 1,806,474 (May 19, 1931).—Sizing is effected with an allutinant containing a resin soap, and the resin soap and paper pulp are treated with an alkali bisulphate such as sodium bisulphate.—A. P.-C.

Paper Making Machine. William H. Millspaugh assignor to The Paper and Textile Machinery Co. U. S. pat. 1,808,055 (June 2, 1931).—The sheet is formed directly on a suction roll provided with two suction boxes. The large suction box acts on the portion of the roll surface which is in contact with the stock in the vat or head box and on which the sheet is formed. The smaller suction box, in which a higher vacuum is maintained, acts on the sheet after it has emerged from the vat or head box. The sheet is couched off on to a felt by means of a second suction roll which bears directly on the forming suction roll.—A. P.-C.

Suction Box for Paper Machines. Tario Yonekura. U. S. pat. 1,810,456 (June 16, 1931).—The suction box is formed by a flexible belt running over two rolls placed at the upper two extreme ends of the base of an inverted triangle, with a revolving suction pipe placed at the apex of the triangle, and with the sides of the Chamber closed air-tight.—A. P.-C.

Paper Making Machine. George S. Witham, Sr. U. S. pat. 1,812,278 (June 30, 1931).—In order to cross the fibers after the

pulp has passed the slice, a rotary agitator is provided at a point just after the stock has flowed under the slice and on to the wire. —A. P.-C.

Inlet for Paper Machines. Forrest Hilsheimer. U. S. pat. 1,809,937 (June 16, 1931).—The inlet or slice mechanism, particularly adaptable to fourdrinier machines, includes a plate which forms the top of the outlet or headbox. The plate is mounted on a shaft extending across the machine, so that by turning the shaft by means of a suitable worm gear the plate and the inlet mechanism may be swung upward to the inactive position or downward to the action position, this providing a rough or quick adjustment for the inlet as a whole. The forward end of the plate carries a bearing rod, on the forward portion of which is engaged a longitudinally extending bar, which projects across the width of the machine and supports the slice. By rocking the bar about the rod, a fine adjustment is provided for the space between the lower edge of the slice blade and the wire, which constitutes the space through which the stock is fed. The blade is supported by means of a number of spaced brackets provided with adjusting screws, by which the blade may be flexed or distorted in a vertical plane, so that the feeding space may be varied in height throughout the length of the slice or inlet.—A. P.-C.

Gearless Suction Roll. William H. Millspaugh assignor to The Paper and Textile Machinery Co. U. S. pat. 1,805,671 (May 19, 1931).—At the free, or front, end of the roll the head is carried in a stationary bracket fixed to the machine frame. At the drive end the head has formed about its periphery an inner bearing race with a corresponding outer bearing race and antifriction bearings. At the drive end a disk or circular head is fixed to the shell, and from the center of the disk extends the indrive shaft, which may be driven from a motor or in any usual way. An annular dam or ring is provided in each end of the shell, of sufficient height radially to check the longitudinal flow of water through the shell and out of the ends, thus causing the water to pass through the perforations in the lower part of the shell, carrying away grit and fiber which otherwise would cause wear on the bearings.—A. P.-C.

Press Roll. John W. Vedder. U. S. pat. 1,803,926 (May 5, 1931).—The press comprises three rolls: a smooth-surfaced upper roll, an intermediate roll having surface indentations, and a crowned lower roll. The surface indentations are adapted to receive moisture at the top and discharge it at the bottom.—A. P.-C.

Suction Roll Shell Drilling. Harry C. Burden assignor to The Paper and Textile Machinery Co. U. S. pat. 1,808,493 (June 2, 1931).—The perforations are made in a great number of very closely spaced parallel ellipses, in a corresponding number of parallel planes, all at the same inclination to the longitudinal axis of the shell. With the holes so arranged, one half of each curve acts to progressively plane and tend to force the packing in one direction, and the following half acts reversely, so that for each revolution of the shell one half of the revolution just counterbalances the effect of the other half.—A. P.-C.

Arrangement of Wet Presses on Paper and Board Making Machines. Walther Heller assignor to J. M. Voith. U. S. pat. 1,810,964 (June 23, 1931).—In the last wet press, at which the sheet is usually reversed, the relative positions of the soft and hard rolls are reversed so that the sheet can be passed right through the presses without reversing; *e. g.*, the first presses generally have a hard top roll and a soft (rubber-covered) bottom roll, and the invention provides that in such a case the last press has a soft top roll and a hard bottom roll, no felt being interposed between the paper and the bottom roll.—A. P.-C.

Mask for Cylinder Molds. Milton O. Schur assignor to Brown Co. U. S. pat. 1,805,499 (May 19, 1931).—The invention provides a method for controlling locally across the width of the cylinder mold the amount of stock deposited, so that the thickness of the sheet may be varied from point to point according to the adjustment. The cylinder mold is mounted adjacent the vat, so that the bottom of the latter extends to the surface of the mold. A mask is provided to cover a portion of the cylinder mold surface extending upwards from the bottom of the vat. The mask may be formed of a large number of narrow strips passing around guide rolls at the bottom of the vat and wound at their other ends around drums or shafts above the vat, so that the lengths of the masks may be varied or adjusted independently while the machine is in operation.—A. P.-C.

Extensible Core Cap. Edwin W. Bebie assignor to International Paper Co. U. S. pat. 1,802,694 (April 28, 1931).—The device consists of a metal cap having an outer flange which is driven over the outside of the metal cap already fitted to the end of the paper core, an inner flange which abuts against the end of the cap already on the paper core, and a web connecting the two flanges. A portion of the inner flange is bent outwardly to receive the study of the chuck which will hold the core and roll in the printing press. The inner flange is made of different depths, in manufacturing the caps, so as to obtain different increased over-all lengths to meet varying conditions of core shrinkage.—A. P.-C.

Core Cap. Walter H. Wickware assignor to International Paper Co. U. S. pat. 1,812,421 (June 30, 1931).—The core cap is made of two separate sleeves or concentric rings joined together by means of flanges to make a core cap which will not be weakened by forming the notch for the driving stud or key, and which will be light and cheap and of great strength and durability.—A. P.-C.

Doctor. John W. Vedder assignor to Rice, Barton and Fales, Inc. U. S. pats. 1,803,924, 1,803,925 and 1,803,927 (May 5, 1931).—*No. 1,803,924.*—The doctor comprises a flexible blade mounted at a distance from its point of contact with the roll and made up of a series of flexible leaves, each bearing on the one below along a line at a short distance from its edge and parallel therewith, to prevent the blade from bending or getting out of position along that line, and also to prevent enough transverse flexibility to cause the upper edge of the doctor to become spaced from the roll at any point. *No. 1,803,925.*—The doctor apparatus comprises a flexible blade mounted on a support, and means whereby the flexure of the blade can be changed at different places along its length transversely. *No. 1,803,927.*—The doctor blade is carried on a support, and on top of the doctor blade is a spring blade with slots extending backwardly from its front edge to divide the latter into sections separately engaging the doctor blade. An adjusting or tightening device is provided for each section.—A. P.-C.

Clamp for Paper Cutters. William L. Valiquette assignor to The Harris-Seybold-Potter Co. U. S. pat. 1,811,483 (June 23, 1931). —The improvement relates to the construction and operation of a supplemental clamping device or paper leveler to be used in connection with the clamp mechanism of paper cutters such as the one disclosed in Seybold's U. S. pat. No. 1,451,120. The object of the invention is to provide a clamp plate which shall extend over practically the entire surface of the paper pile, for use with light and fluffy papers which ordinarily do not lie flat.—A. P.-C.

Cylinder Machine. Wochbl. Papierfabr. 62, No. 19: 448 (May 9, 1931).—General resume of the cylinder machine, especially in comparison with the other paper mill machinery which is replacing it in certain cases.—J. F. O.

Fourdrinier Machine with One or More Top Wires. "The Erkens Machine." Zellstoff Papier 11, No. 3: 142 (March, 1931). —The advantages of the fourdrinier and cylinder machine are combined. The idea is to eliminate the couch press thus making possible the manufacture of the finest papers with their water marks. The top wire is shaken parallel to the bottom wire. The construction and operation of this machine is described along with its other uses.—J. F. O.

Method of and Means for Treating Fourdrinier Wires. Albert R. Weissenborn assignor to Appleton Wire Works. U. S. pat. 1,811,870 (June 30, 1931).—In order to prevent scoring of the suction box covers by the wire, the latter is treated in a manner which produces a relatively permanent zigzag shape, the

treatment consisting in stretching the wire between spaced points while a portion of the belt intermediate of the spaced points is held laterally displaced. This carried out when the wire is stretched after having been woven.—A. P.-C.

Woven Wire Belt for Paper Machines. Nelson W. Webb assignor to Eastwood Wire Corp. U. S. pats. 1,821,412 and 1,821,453 to 1,821,456, incl. (Sept. 1, 1931).—*No. 1,821,412.*—A weft strand of elongated cross section is provided at each end. The seam is formed by looping a wire about the end weft wires in such a way that diagonally disposed portions are looped from the upper to the under side of one end weft strand and then from the upper to the under side of the other end weft strand without passing over warp knuckles. The lacing wire is thus drawn snugly on the elongated surfaces of the end weft wires to eliminate gaps. *No. 1,821,453.*—The lacing wire used to make the seam passes over one of the end weft strand at the opposite side and at points directly opposed to those at which the warp strands pass under the end weft wire. The lacing wire is then carried to the under side of the same weft wire and from there passed over the other end strand and then passed back under the first end weft strand at points at which the warp strand ends pass over it. In this way the lacing wire is at no point engaged with the upper surface of the warp strand ends which pass over the end weft strands. *No. 1,821,454.*—The seam is made with a number of lacing wires carried about the end weft strands, each of the lacing wires comprising a number of sections having ties at their ends, the ties of one wire being disposed at points intermediate the ties of the other wire. *No. 1,821,455.*—All of the warp wire ends at one end of the length of wire cloth are placed in line with each other and engaged at one side of a weft wire at the other end of the cloth, and means are provided for connecting the warp wire ends to the weft strand. *No. 1,821,456.*—A space is formed at each end of the length of wire cloth by removing the end weft strand. A solder-covered element is placed so as to extend into the spaces thus left at each end and of the length of cloth and the ends of the warp wires are attached by heating the solder-covered element.—A. P.-C.

Fourdrinier Paper Machine. Austin E. Cofrin. U. S. pat. 1,826,735 (Oct. 13, 1931).—Part or all of the table rolls are replaced by relatively narrow, closely spaced scrapers.—A. P.-C.

Cylinder Paper Machine. Walter J. Zimmerman assignor to Mead Paperboard Co. U. S. pat. 1,821,198 (Sept. 1, 1931).—The couching felt is driven by a suction press, the paper being on the under side of the felt when it is picked off the cylinder and on the upper side when it passes through the suction press.—A. P.-C.

Machine for Rewinding Webs of Paper. Clarence H. Webster assignor to R. W. Crabtree and Sons, Ltd. U. S. pat. 1,806,774 (May 26, 1931).—The invention relates to apparatus for rewinding or re-reeling webs of paper from remnant reels so that the latter may be utilized by being successively joined and rewound into a new reel, which in being rewound may be simultaneously cut or slit. The tubular cores of the remnant reels are carried at their respective ends upon a pair of rotatable cones mounted on pedestals which are adapted for independent transverse movement required for the mounting and withdrawal of the remnant reels, and which are also adapted to be moved together for the transverse adjustment or lay of the web in rewinding. The rotatable cones are mounted so that the thrust by which the core is held by the cones is transmitted through interposed springs.—A. P.-C.

Calender. Johannes Kleinewefers assignor to the firm Johannes Kleinewefers Söhne. U. S. pat. 1,803,356 (June 2, 1931).—The invention relates to calenders in which the pressure is applied to the rolls by means of hydraulic cylinders. In order that the pressure at the two ends may be adjusted independently, each pressure cylinder is connected to a separate accumulator. In order that this arrangement may also be used in connection with cylinders having different diameters, the two pressure cylinders are shiftably guided on the machine frame in the direction in which pressure is applied, so that they may be adjusted, for instance by means of screw spindles.—A. P.-C.

Paper Winding Apparatus. Earl E. Berry assignor to Beloit Iron Works. U. S. pat. 1,826,041 (Oct. 6, 1931).—The two winding drums are mounted so that they can be rocked about a common longitudinal axis intermediate the two drums, so as to discharge the finished roll.—A. P.-C.

Miscellaneous

Chromium-Nickel Castings in the Sulphite Industry. Bertrand S. Summers and J. D. Corfield. Paper Trade J. 93, No. 13: 37-38 (Sept. 24, 1931).—A brief discussion of the structure of iron-nickel-chromium alloys from the standpoint of their mechanical properties and usefulness and suitability for resistance to corrosion in sulphite mills.—A. P.-C.

Durability of Paper. World's Paper Trade Rev. 96: 1097-1110 (Oct. 2, 1931).—A report of the discussion of the delegates of Corresponding Societies held in connection with the meeting of the British Association at the Imperial Institution, London, on the afternoon of Sept. 24, 1931.—A. P.-C.

Research in the Use Requirements of Papers. P. K. Baird. Paper Trade J. 93, No. 14: 44-45 (Oct 1, 1931).—An outline of the objectives and plans of the Committee on Use Requirements of Paper of TAPPI, together with brief comments on the chief properties of paper which have so far been delineated.—A. P.-C.

Purifying Waste Waters from Cellulose or Other Factories. Metallgesellschaft A.-G. Brit. pat. 344,282 (June 29, 1929).—A process utilizing an adsorbent, as described in Brit. pat. 305,657, is carried out with exclusion of air or other gases from the adsorbent, so far as possible, during the adsorption and extraction stages and transition from one stage to another.—A. P.-C.

Method of Reducing the Yellowing of Paper with Age. Walter O. Snelling. U. S. pat. 1,814,344 (July 14, 1931).—Paper is tinted with a relatively permanent blue and a fugitive yellow, each in amount insufficient to import color to the paper when used in combination.—A. P.-C.

Water Supplies from Deep Wells. L. A. Iggulden. Paper Maker & Brit. Paper Trade J. 82, No. 2: xliii-xlv (Aug. 1, 1931).—A discussion of the advantages of securing water from artesian wells over the the purchase of metered water.—A. P.-C.

Stories of British Paper Making. Springfield Paper Mills, Polton. Anon. World's Paper Trade Rev. 96: 1036-1040, 1076, 1078 (Sept. 25, 1931).—A. P.-C.

Ideal Mill. The Story of St. Ann's Board Mill, Bristol. Anon. World's Paper Trade Rev. 96: 1130-1158 (Oct. 2, 1931.)—A description of the mill.—A. P.-C.

Paper and Board Consumption Per Capita Per Year in Various Countries. Mirus. Paper-Fabr. 29, No. 23A: 38-39 (June, 1931).—Tables are given for the consumption of paper and board per capita per year, for 1913, 1922 and 1929. United States was first in 1929 with a paper consumption of 66.6 kilograms per capita, then follows Great Britain with 37, Sweden with 29.3 and Germany fourth with 27.7 kilograms. The United States showed a 140 per cent from 1913 to 1927, 1929. The consumption of news print is also given.—J. F. O.

Oldest Paper Mill in Bergisch-Gladbach. F. Schmitz, Wochbl. Paper fabr. 62, No. 28: 665-667 (July 1, 1931).—By means of a sketch dating from 1639, the arrangement of the oldest paper mill in Bergisch-Gladbach is described.—J. F. O.

Wages in the Manufacture of Paper. Zellstoff Papier 11, No. 6: 384, (June, 1931).—Statistics for the wages paid in different territories in Germany prepared by government agencies.—J. F. O.

Printer and Paper Maker. Zellstoff Papier 11, No. 6, 355-356 (June, 1931).—Realizing that conditions between the printer and paper maker could be materially improved, the author gives several suggestions whereby they could work closer together and learn the necessary things of the other fellows business.—J. F. O.

Thirty Years of Progress in the Sulphite Industry

By Elliott R. Barker[1]

The last thirty years have been a period of great development in the sulphite pulp industry, especially along the lines of accurate scientific knowledge of the process and ways of applying knowledge to the improvement of the product. Efficiencies in operation and savings in costs have developed simultaneously.

In 1900 the best of our sulphite mills used cooking acid containing about 4 per cent total sulphur dioxide (determined by iodine titration) of which 2.5 per cent was free (by caustic soda titration) and 1.5 per cent was combined. The time of cooking varied from 7 to 20 hours, the yield was about 1,000 pounds of air dry pulp per cord of spruce wood and less with balsam and hemlock, screenings were 5-10 per cent, sulphur seldom less than 300 pounds per ton, lime and limestone relatively high, and the quality of the product very low—just barely usable and in many cases so poor that whole digesters of stock were dumped into the rivers. It is interesting and instructive to analyze some of the controlling factors of thirty years ago and to note the gradual and steady improvement in the process.

We are now using the same kinds of wood, sulphur, lime and limestone, water, steam and every other raw material. Much of the equipment has not changed in design or in any way affecting the quality of product or economy of operation.

The chips are perhaps more uniform in size and length or are better screened than formerly but whether present day chips produce better pulp than those of 1900 is debatable, and about all we can say, lacking positive proof, is that it is reasonable to assume that chips uniform in size and dryness should be more easily treated and produce more uniform pulp. Screened chips contain less dirt and are therefore more desirable for most grades of pulp. More chips ½ inch long will pack into a digester than if 1 inch long and should be more readily penetrated by the bisulphite liquor.

Digesters and linings have not been changed in any important ways affecting quality of product or economy of operation.

The great changes which have resulted in better product at less cost are acid making, cooking and recovery from the digesters, screening and riffling the pulp and bleaching. Let us discuss these factors in reverse order.

Neither the bleaching system nor the screening and riffling systems can produce a good product if the unbleached pulp is of low quality, so they are not fundamental factors in this discussion but are rather means of improving a product made elsewhere. Let us give credit however to the great improvements in methods and machines for separating dirt and undesirable fibers in the new screening and riffling systems, to the savings in space and maintenance by the use of centrifugal screens, to the improved ways of removing knots, bark and dirt in both screens and rifflers and to the advantages of two-stage and high-density bleaching. Such men as Bellmar, Bachewiig, Wolf, Fletcher and Thorne have added greatly to our knowledge of these processes.

The one department of the sulphite mill where nearly every piece of equipment has undergone complete change in design and method of operation is the acid plant. The sulphur burning equipment is completely revolutionized, the rotary burner and the steel tank combustion chamber have outlived all other designs. Tromblee and Paull made a valuable contribution to the industry in the rotary sulphur burner. The steel tank combustion chamber, first designed by the writer, was the perfecting touch to this equipment, practically eliminating all danger of the formation of sulphur trioxide and sulphuric acid from the gas.

The evaporative type of gas cooler has proven more efficient and less expensive to build than the submerged type or Burgess cooler and will no doubt replace these types as they wear out.

During the last 30 years very little change has been made in the preparation of milk of lime from burned lime, dolomite or magnesite although some operators have unnecessarily increased the temperature of the limewater by the use of too much steam in slaking. Except for limes containing over 50 per cent magnesia no steam is needed, if the procedure is correct and not too much water is used.

Those using limestone for acid making have found that a dense stone like marble gives best results, that dolomite stones are too readily soluble and produce too high combined when used in the usual type of towers; that the size of stones and the hardness are important controlling factors in determining the percentage of base in the raw bisulphite liquor. Each mill must adjust these factors to produce best results.

In general burned lime containing 40 per cent magnesia is in greatest favor for use in the milk of lime system and limestone with the highest percentage of calcium oxide is preferred for use in the limestone towers.

Neither the relative merits of the limestone and milk of lime systems nor the effect of the sulphites of calcium and magnesium in the cooking liquor will be discussed

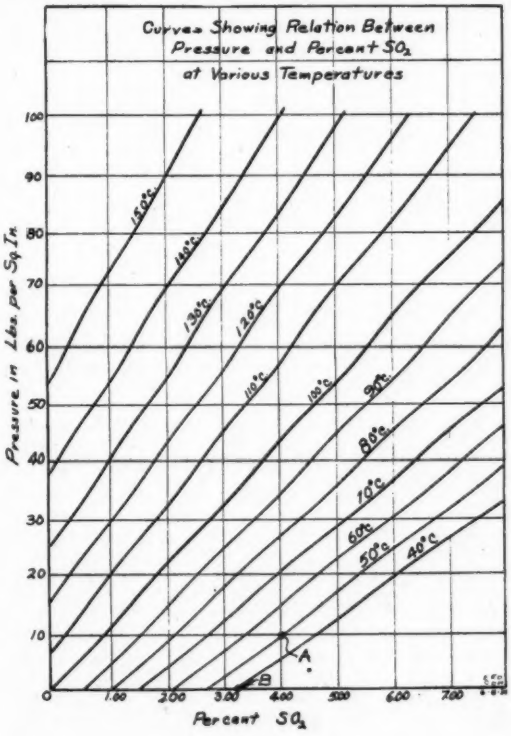

CHART 1.

[1] Consulting chemist and engineer, Boston, Mass.

here, but other factors affecting the economy of operation and the quality of product and of greater importance will be taken up.

The constants having the greatest effects on all problems of acid making, cooking and reclaiming are shown graphically on charts 1, 2 and 3. These data have all been worked out during the past year in the form of a thesis by Elliott R. Barker, Jr. and Carl B. Malone at the University of Maine, to whom the writer is indebted for this information.

It is a well known fact that the solubility of sulphur dioxide in water varies directly as the pressure and inversely as the temperature. In mill practice the acid used contains magnesium or calcium bisulphites, or both, in a solution of sulphurous acid. The bisulphites are unstable compounds, at rising temperatures changing into monosulphites which are very slightly soluble in water as follows:

$CaSO_3.2H_2O$ = .125 grams in 100 c. c. of cold water.
$MgSO_3.6H_2O$ = 1.25 grams in 100 c. c. of cold water.
= .83 grams in 100 c. c. of hot water.

Thus the solubility of the sulphites of lime and magnesia is almost wholly dependent on the presence of sulphurous acid or free sulphur dioxide as it is commonly called.

To avoid troubles caused by the precipitation of the monosulphites of calcium and magnesium by heating, it was necessary (for the sake of accuracy) to use sulphur dioxide alone in obtaining the charted data. As the bases, their sulphites and bisulphites are practically insoluble except in sulphurous acid, and the combined, so-called, in mill practice constitutes only a small percentage of the total sulphur dioxide in the acid solution, we can consider the charted data sufficiently accurate to explain mill conditions.

Examples, showing the use of the charts:

If at any point in our acid making or recovery systems we require 4 per cent total sulphur dioxide in our acid the temperature must not exceed 50 deg. C. at 10 pounds pressure. (See chart 1 at A.)

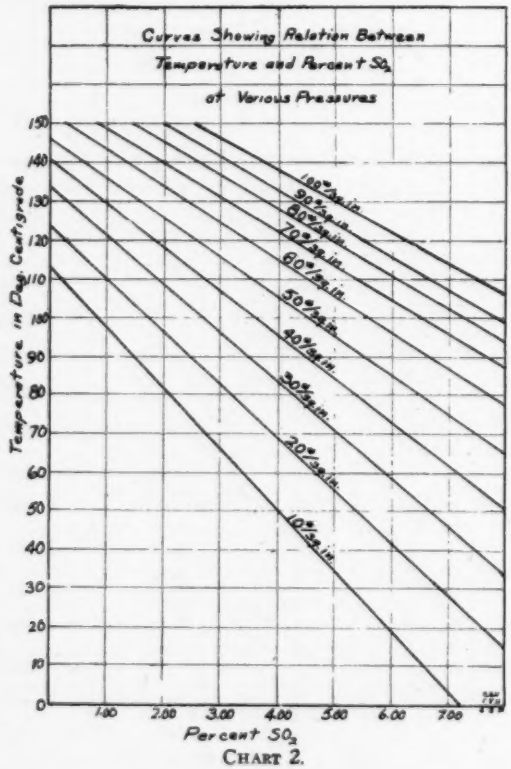
Curves Showing Relation Between
Temperature and Percent SO_2
at Various Pressures
Temperature in Deg. Centigrade
Percent SO_2
100 Lbs. per Sq. in.
90 Lbs. per Sq. in.
80 Lbs. per Sq. in.
70 Lbs. per Sq. in.
60 Lbs. per Sq. in.
50 Lbs. per Sq. in.
40 Lbs. per Sq. in.
30 Lbs. per Sq. in.
20 Lbs. per Sq. in.
10 Lbs. per Sq. in.

CHART 2.

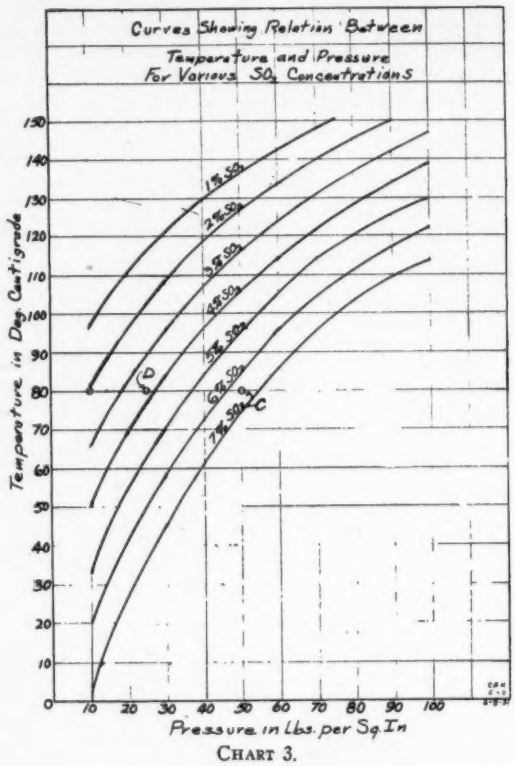

CHART 3.

At atmospheric pressure and 40 deg. C. saturated acid contains about 3.25 per cent total sulphur dioxide. (See chart 1 at B.)

In an accumulator or digester, if the temperature is 80 deg. C. a pressure of 50 pounds must be maintained at all times if the acid contains 6.50 per cent total sulphur dioxide. (See chart 3 at C.)

If at any time the pressure is reduced say to 25 pounds, sulphur dioxide gas will rapidly leave the acid until the remaining total is less than 4 per cent. (See chart 3 at D.) and if the pressure is reduced to 10 pounds still further loss of sulphur dioxide will ensue until only 2 per cent total sulphur dioxide is left in solution.

These factors are of immense importance in all acid making and reclaiming problems as they control every step in the design and operation of equipment. Thus we find that all attempts to transfer saturated acid made at high temperature and pressure to digesters or other containers at lower pressure have resulted in large quantities of escaping gas. To maintain the high pressure necessary to prevent the escape of gas is an expensive problem.

Making Raw Acid Under Pressure Without Gas Coolers

(1) In our efforts to reduce the cost of manufacturing sulphite pulp through saving of heat units we often wonder why the heat from the sulphur burners, combustion chambers and gas coolers cannot be used to reduce the quantity of heat used for cooking. With accumulators of course this is possible, and in this instance the best medium in which to store the heat is the raw acid itself. If we assume that the following conditions represent the extremes with which we have to contend, as well as the greatest possible savings of heat units we have a very interesting problem.

Extreme Conditions:

Raw acid = 2000 gals. per ton of pulp (1.04 Sp. Gr.)
Raw acid test = 5 per cent total sulphur dioxide.
Gas test = 15 per cent sulphur dioxide.
Gas temperature = 815 degrees C.
Water temperature = 27 degrees C.
Maximum pressure of accumulator = 30 pounds per sq. inch.

Without allowing for heat losses from radiation or changes in temperature due to chemical reactions the problem solves as follows:—

2000 gals. Raw acid × 8.33 × 1.04 = 17326 pounds.
17326 pounds @ 5 per cent total SO_2 = 886 pounds SO_2 per ton of sulphite pulp.

Composition of Sulphur burner gas:

By volume		By weight
15 per cent SO_2	× 0.0029 =	0.0435 gms.
80 per cent N_2	× 0.00125 =	0.1000
5 per cent O_2	× 0.00143 =	0.00715
		0.15065 gms. per 100 C.C.

$$\frac{0.0435}{0.15065} \times 100 = 29 \text{ per cent } SO_2 \text{ by weight}$$

$$\frac{886}{.29} = 2987 \text{ pounds gas (containing 15 per cent } SO_2 \text{ by volume) per ton of sulphite pulp.}$$

Temperature rise in compression (assumed adiabatic)

$$\frac{T_2}{T} = \frac{P_2}{P_1}\left(\frac{\gamma - 1}{\gamma}\right), \qquad \gamma = 1.406 \text{ for air assumed to apply}$$

$$T_2 = 1960\left(\frac{44.7}{14.7}\right), \quad \left(\frac{1.406 - 1}{1.406}\right) = 1960 \times (3.04)^{0.29}$$

$$\log T_2 = \log 1960 + 0.29 \log 3.04$$
$$= 3.43229$$
$$T_2 = 2706 \text{ degrees absolute or } 2706—460 = 2246 \text{ deg. F.}$$

(2) Total Heat in the gas — Heat leaving = Heat absorbed by water

W_1 R T_1 = W_2 R T_2 = $W_2K(T_2—2_1)$ R = gas constant (air), K = specific heat

$$\frac{2987 \times 53.37 \times 2706}{(1.406—1) \times 788} - \frac{2987(1.00—0.29)53.37T_2}{(1.406—1) \times 788} = 17326 \times 1.0T_2 — 17326 \times 540$$

Solving T_2 = 606 degrees absolute or (606—460) = 146 deg. F.
Final acid temperature = 146 deg. F. or 63.3 deg. C.
Equivalent Heat added per Ton of Pulp
17326 (606—540) = 1,143,516 B.t.u.
at 1180 B.t.u. per pound Steam = 969 pounds steam per ton of pulp.

Similarly, if the sulphur usage is 215 pounds per ton of pulp and the raw acid contains 4 per cent total SO_2 and all other conditions in (1) remain constant, the equivalent heat = 483 pounds of steam per ton of pulp. This figure represents the maximum steam saving which could be expected under efficient operating conditions if the raw acid is made under pressure in an accumulator without losses by radiation.

Interesting Conclusion

1. At a pressure of 30 pounds and a temperature of 63.3 deg. C. raw acid can be made without a gas cooler. Neither of these factors would involve large expense or serious mechanical troubles if the economies warrant the expenditure.
2. The total heat possible to save amounts to an equivalent of 483 pounds of steam per ton of pulp if the sulphur usage is 215 pounds per ton.
3. To accomplish this saving we must compress the hot gas to 30 pounds pressure and must also introduce the water to the absorption apparatus at this pressure.

With our present low cost of steam this saving is hardly worth while.

This problem does however show that the amount of heat recoverable from this very large amount of sulphur at a very high temperature is very small in terms of steam per ton of pulp, in other words, the specific heat of gas is so low that heat recovery from this source is not worth considering. These facts are equally true as applied to the possible heat saving from the gas relieved from the digesters during cooking; but more of this later.

Application of the Charted Data to Mill Conditions

WHY RELIEF PIPING CLOGS.

Serious difficulty has been experienced in the past with clogging of the relief piping, especially if two relief lines are used, one for liquor and one for dry gas (so-called). Trouble occurred with the liquor piping because the liquor, being a saturated solution under digester pressure and temperature was relieved into a zone of lower pressure in the relief piping. A rapid evolution of gas ensued leaving too little sulphur dioxide to hold the base or combined in solution. Precipitation of monosulphite of lime in the pipes was inevitable.

If however the same piping was later used for relief of the dry gas the monosulphite was again changed to bisulphite and dissolved in the presence of sulphurous acid. If the relief piping is immediately submerged in water, the sulphur dioxide remains in solution even under the reduced pressure thus insuring an excess of sulphur dioxide to prevent the formation of monosulphites.

BORING A DIGESTER.

This term is used to explain a condition in which the steam is not diffused uniformly through the chips and acid in a digester but rises through a localized part of a digester causing a sudden rise in temperature at the top, with the release of a large quantity of gas from the acid. The sudden release of the gas from the acid in certain sections induces precipitation of monosulphites on and among the chips usually cementing them together into masses which are neither penetrated by the acid nor reduced to fiber by the subsequent cooking process. This phenomenon is entirely a matter of localized overheating.

The one sure way to bore a digester is to introduce the steam too fast. After the pressure has reached 50 pounds it is impossible to bore a cook as this pressure with its accompanying temperature prevent a too rapid inflow of steam.

As this condition depends on the solubility of the sulphites of lime and magnesia in sulphurous acid, and as the solubility of the sulphites in water alone is so very low, it follows that a digester filled with liquor containing a high percentage of base or combined and a low percentage of free sulphur dioxide is more likely to bore through rapid inflow of steam than one containing a lower combined and a higher free. Thus we find that boring was a common trouble 25 or 30 years ago and never occurs now in mills using strong cooking liquor, although in many instances digesters are brought more rapidly to pressure now than was previously thought possible.

A purely mechanical means to prevent boring and allowing a rapid inflow of steam consists in the use of a plurality of steam nozzles equally spaced around the bottom cone of the digester. This was first done by William A. Luke, U. S. patent 683,129, dated Sept. 24, 1901, and constituted one of the most effective improvements in the quick cooking process in the early part of this century. The mills using this system have always had good circulation, high fiber yield and very low percentages of screenings. The advantages of this method of steaming have been so great that many mills still use it although the advantages in its favor are not so apparent now that stronger cooking liquor is used.

Digester Circulation

From the success of the Luke system and from the use of mechanical means of circulating and heating the liquor in the digesters in allied processes many of our technicians have been led to believe that circulation in the digester is the one most important factor, and, if this can be improved by any mechanical means, we shall have solved our most difficult cooking problem.

No one knows just how much circulation occurs in a digester. Is there an actual movement of the chips and cooking liquor from one part of the digester to another?

We have some indications that the liquor actually circulates to some extent but very little indication of movement of chips except at the top of the mass where some may float or be moved by the liquor. In rotary digesters,

however, we have positive agitation of chips and acid which explains the uniform quality of fiber produced.

It seems to me that the only effect of circulation is to insure the presence of sufficient chemicals in contact with every chip, under uniform temperature and pressure, to react chemically with the intercellular matter making it soluble and thus freeing the fibers. This definition is self-evident. Therefore all factors entering the problem are to assist a chemical reaction. Increased temperatures and pressures, rapidity of circulation and all means used to influence these factors are incidental and of minor importance to the chemical reaction. To try to correct a chemical deficiency by mechanical means is futile, complicated, and usually extravagant.

The circulating systems proposed and tried (except the rotary digester) have failed because in connection with the mechanical means used the experimenters have lost sight of the relative solubility of the sulphites in the presence of varying percentages of sulphur dioxide as explained by the charts. For every condition of temperature and pressure in the digester there is a solubility equilibrium established which is very sensitive.

For example the Morterud system of circulation never worked well on American sulphite digesters because the steam introduced into the circulated liquor raised the temperature so rapidly that the sulphur dioxide left the liquor and the sulphites crystallized eventually clogging the piping.

The Bullard system of circulating tried out in a midwestern mill in 1921 used a worm propeller to force the liquor from one part of the digester to another. The reduced pressure on the suction side of the worm propeller upset the solubility equilibrium of the liquor and caused precipitation of the sulphites so that all the piping clogged.

More recent attempts of a similar nature have failed for the same reasons although in some cases large amounts of power have been used to force the circulation of the digester liquor. The greater the power, the greater the disturbance of the solubility equilibrium and the more positive the failure. The solubility of sulphites is no respecter of pumps, propellers, heaters or other contrivances but obeys only the well known laws.

If mechanical agitation or circulation is most effective we should expect that rotary digesters in which both these factors are ideally positive should produce the most uniformly good pulp with the lowest usage of heat and chemicals. As a matter of fact, an Eastern plant having rotary digesters uses as much steam for cooking as our best quick-cooking mills, uses 221 pounds of sulphur per ton (eight months of 1931) as compared to 215 (May-Sept. incl. 1931) in the quick-cooking mill, and does not make a superior product. In other words, if we can judge from actual mill operations and results we must admit that mechanical agitation or circulation is a failure, other methods having been developed to obtain better results.

The question naturally arises 'why try to correct a chemical condition by mechanical means?' There is no justification until all simple chemical means have been exhausted to the point where further chemical progress is more expensive than mechanical means.

Cooking

Cooking being a chemical process by which the intercellular matter is dissolved, and the fibers freed, is subject to the well known laws, the most important of which is the law of diffusion. All dissimilar materials by diffusion tend to unite to form homogeneous mixtures. For instance, two liquids of the same specific gravity if mutually soluble will rapidly diffuse together. Similarly gases diffuse very rapidly together. In the case of a sulphite digester we have chips composed of bundles of fibers, loosely cemented together with intercellular matter, which may be solid at low temperatures but which softens readily at higher temperatures, and bisulphite liquor composed of sulphites of lime and magnesia held in solution by free sulphur dioxide. Moisture and voids or air cells also provide channels to assist diffusion. Thus we have solids, liquids and gases in contact with liquid bisulphite liquor.

The rate of diffusion between the soluble parts of the chips and the liquor depends on the relative strength or concentration of the materials in contact. If the bisulphite solution contains a high percentage of active chemical constituents the rate of diffusion into the chips will be more rapid than if the solution is more dilute. Complete diffusion probably never occurs in the allotted time but when sufficient active chemical constituents have diffused or penetrated the chips to complete the chemical reaction we say that penetration is good or sufficient. Our proof of this lies in the fact we know from actual experience that after a certain time allowed for penetration we can cook the digester as fast as desired without danger of uncooked chips.

Chips

If the chips are too thick, or too long, or the period of penetration too short, sufficient chemicals may not reach all parts and we find 'red hearts' or uncooked portions of chips in the product. The percentage of these uncooked portions is a measure of efficiency of the process.

Acid

It is also evident that during this period of diffusion or penetration moderate temperature must be maintained, for if the temperature is too high much sulphur dioxide gas will be driven from the solution and the rapid rate of diffusion due to strong liquor will be defeated.

This fact has been demonstrated in certain systems of recovery of heat units from one digester to another where liquor at high temperature and pressure has been put into a digester at much lower pressure with consequent liberation of large quantities of free sulphur dioxide. High pressure pumps may be used to attempt to force this gas back into solution but the free gas being at the top of the digester cannot readily be brought into contact with the liquor among the chips, so the effort to restore strong acid under these conditions is futile.

It therefore is evident that strong cooking liquor, saturated with sulphur dioxide at atmospheric pressure, will give more rapid and more complete penetration than liquor prepared in an outside accumulator at high temperature and pressure, for in the latter case there must be a large evolution of gas before penetration is complete if for any reason the maximum pressure is reduced.

Diffusion or penetration is accelerated by shorter chips and by increased temperature up to the point where the free sulphur dioxide begins to leave the solution. Thus it is commonly stated that penetration is complete when the cooking temperature has reached 100 deg. C. and 50 pounds pressure. This checks with the charts as under these conditions there is a rapid evolution of gas from the liquor.

Cooking Conditions

As the cooking cycle progresses into the higher temperatures the rapid evolution of gas gives a false, or so-called, gas pressure at the top of the digester. If the cooking conditions have been correct up to this point sufficient chemicals will have penetrated every chip to complete the chemical reactions, and the excess chemicals may be recovered.

If strong cooking liquor is used, the more rapid evolution of sulphur dioxide gas must cause far more agitation or circulation in the digester than will be the case if more dilute liquor is used. Agitation caused by the evolution of gas in the digester is comparable to that obtained by blowing air into a tank of liquid. Furthermore, the amount of gas evolved and the consequent agitation or circulation must be in proportion to the percentage of the free sulphur dioxide in the solution. For instance, we should expect 50 per cent more agitation from cooking liquor containing 6 per cent free as compared to that containing 4 per cent.

Since we have no way to accurately measure such factors as penetration, agitation and circulation we must judge them by practical observations of the men doing the acid making and cooking, by available temperature and pressure records, and by the final product. Provided the men suffer no physical inconvenience or discomfort in the making or use of strong acid, we hear only commendation, the acid making is easier, cleanups less frequent, the digesters cook better, blow clean, the stock is good and everyone is happy.

Recovery of Heat and Chemicals from the Digesters

(3). If 2500 gals. of bisulphite liquor containing 7 per cent total SO_2 (1.06 sp.gr.) have been put into the digester per ton of pulp

2500 gals. × 8.33 pounds × 1.06 = 22075 pounds

22075 pounds × .07 = 1,545 pounds sulphur dioxide

or = 773 pounds sulphur per ton.

If we assume a usage of 273 pounds of sulphur per ton we shall have 500 pounds of sulphur per ton to be recovered. This is about 64 per cent of the sulphur in the original cooking liquor. If in contrast the cooking liquor has only 3.5 per cent total sulphur dioxide there will be very little recoverable sulphur in the digester. This excess of sulphur, some in the form of liquor and more in the form of gas, is a tremendous factor in all matters of penetration, agitation and chemical reaction and is not generally appreciated.

(4) If we recover 100 pounds of sulphur in the form of SO_2 gas from the digester under average conditions we have the following problem.

Assume 100 pounds sulphur = 200 pounds SO_2 at temperature of 120 deg. C. or 248 deg. F. and pressure of 15 pounds gauge or 29.7 pounds absolute on the relief piping.

From table of properties of SO_2:

29.7 pounds pressure corresponds to temperature of 44.46 deg. F. Density of saturated (dry) vapor = .3658 pounds per cu. ft. Then volume at this temperature of 200 pounds $SO_2 = \frac{200}{.3658} = 547$ cu. ft.

If superheated to 248 deg. F. the volume will be $547 \times \frac{708}{504.46} = 770$ cu. ft. at 15 pounds pressure and 120 deg. C., and at 70 pounds pressure in the digester the volume will be $770 \times \frac{29.7}{84.7} = 270$ cu. ft. of SO_2 gas per 100 pounds sulphur.

(5) Conditions 30 Years Ago

300 pounds sulphur per ton. Cooking acid = 4.00 per cent total SO_2

2500 gals. per ton × 8.33 × 1.04 = 21,658 pounds

21658 @ .04 = 866 pounds SO_2 = 433 pounds sulphur

If 300 pounds used for the chemical reactions

433 — 300 = 133 pounds sulphur recoverable.

(6) Conditions Now.

210 pounds sulphur per ton. Cooking acid = 7.00 per cent total SO_2

2500 gals. per ton × 8.33 × 1.06 = 22.075 pounds

22075 @ .07 = 1545 pounds SO_2 = 778 pounds sulphur

If 210 pounds used for chemical reactions

778 — 210 = 568 pounds sulphur recoverable

This is 4.3 times the result of first problem.

Therefore, under present day conditions we have over four times as much SO_2 gas liberated in the digesters as we had 30 years ago.

With present cooking methods we use less steam than 30 years ago. It would, therefore, seem that recoverable SO_2 gas is the most important means of circulation as well as penetration in our digesters. All our practical results substantiate this assertion.

(7) If there are 568 pounds of recoverable sulphur per ton of pulp under the above conditions, and each 100 pounds of sulphur = 270 cu. ft. of SO_2 gas under digester conditions (see (4)).

270 × 5.68 = 1533.6 cu. ft. SO_2 gas evolved in the digesters per ton of pulp.

As a measure for comparison let us consider that digester capacities are usually figured on the basis of 400-450 cu. ft. per ton of pulp, and

$\frac{1533}{425} = 3.6$, Thus, with 7 per cent cooking acid we introduce into the digester and subsequently liberate 1533 cu. ft. of SO_2 gas per ton of pulp or 3.6 times the volume allotted to each ton of product.

In actual practice, there is every indication based on the quality of product and economy of heat and chemicals, that the agitation and circulation caused by the liberation of the recoverable SO_2 gas is as efficient as has ever been obtained by mechanical means.

The actual increase in volume of cooking liquor as compared to the raw liquor is usually about 25 per cent and rarely over 33 per cent. Therefore, the greater part of the recovery is in the form of gas. Although the volume of the gas is large compared to the liquid relief, the specific heat of the gas is so low and that of the liquor so high that only a small percentage of the recoverable heat units are contained in the gas relief. Some scientists calculate that between 1/6th and 1/8th of the heat units relieved from the top of the digester are contained in the gas relief while the remainder is in the liquid relief.

In actual practice among our American quick cooking mills we find as low steam usage for cooking in those mills where the gas relief is cooled and absorbed in the reclaiming tanks or towers under atmospheric pressure as in those where it is absorbed in accumulators at the temperature and pressure needed to hold the gas in solution.

As previously pointed out at C on chart 3, saturated liquor at 80 deg. C. and 50 pounds pressure contains about 6.50 per cent total sulphur dioxide whereas saturated acid made under normal conditions where the gas relief is cooled and absorbed in tanks or towers at atmospheric pressure often contains 10 per cent total sulphur dioxide and seldom less than 6.5 per cent. It has also been found impossible to hold all the relief at practical working pressures in an accumulator and a large amount must be vented from the top and returned for sake of economy to the acid plant. This fluctuating quantity of very strong sulphur dioxide gas is very active in attacking the stone in the limestone tower systems, thus increasing the combined in the raw acid; or in varying the total and free if absorbed in the milk of lime system. Any such fluctuating conditions add to the difficulties of acid making and recovery. Before adjustments can be made there are usually losses of sulphur dioxide gas. A higher combined in the acid over that required to complete the chemical reactions in the digester always results in high sulphur usage as the excess sulphites in the liquor are discharged with the pulp from the digester and go to the sewer.

Strong Bisulphite Liquor

During the last twenty years much study and experiment has been devoted to the production of strong cooking liquors. During the first decade of the century we tried with our inefficient equipment to make the acid as strong as possible for we noted in every instance that a high test of acid resulted in a higher grade of product. About 1910 positive progress was made in this problem; one school using pressure acid systems to increase the percentage of free sulphur dioxide in the acid, and the other redesigning the absorption equipment for greater absorptive ef-

ficiency and later using auxiliary and reclaiming towers to more easily absorb the sulphur dioxide gas thus increasing the free in the acid.

The scientific phases of this matter are so well explained and proven by Erik Hagglund in an article published in July, 1931, in Paper Industry entitled 'Importance of Bisulphite Ion Concentration in the Sulphite Cooking Process' that further proof is hardly necessary. If this title had read 'Importance of Combined and Free in Cooking Acid' and some of the terms used in the description more simple I am sure our sulphite managers would have gained more from it.

Dr. Hagglund shows that (1) certain definite percentages of combined must be present in the acid to insure proper sulphonation of the intercellular matter, (2) hydrolysis or loss of cellulose through conversion into sugar occurs at the higher temperatures, (3) cooking acid containing 8 per cent total sulphur dioxide gives a fiber yield of over 60 per cent as compared to 52 per cent yield if acid containing 4.28 per cent total sulphur dioxide is used and (4) for maximum yield of fiber the strongest possible acid is needed.

This data checks exactly with methods and results now in use and obtained in some of the most efficient mills in the United States and Canada. By the use of cooking acid containing 7-10 per cent of total sulphur dioxide, with efficient recovery of the excess heat and chemicals from one digester to another, by cooling the dry relief not directly injected into another digester, and absorbing it in raw acid we now have mills making high grade sulphite pulp at an expenditure of 200-225 pounds of sulphur and 5,000 pounds of steam for cooking per ton of unbleached pulp, and less than 250 pounds of sulphur per ton of bleached pulp.

Such results prove conclusively that the methods used are most economical, the yield is large, the losses very low and the product of high grade. Quality and economy go hand in hand in sulphite pulp manufacture.

Conclusions

1. High test or concentrated bisulphite liquor used in sulphite cooking has every advantage in economy of operation and quality of product. Maximum concentration is apparently only limited by our ability to design means whereby losses are prevented.

2. Agitation, circulation and penetration in the digesters depend primarily on the concentration of the bisulphite liquor; temperature and pressure being secondary means to assist the chemical reactions.

3. The Amount of agitation and circulation varies directly with the excess of sulphur dioxide above that needed to complete the chemical reactions; and the rate of penetration varies directly with the total sulphur dioxide in the cooking liquor.

4. When saturated bisulphite liquor is put into the digester any increase in temperature, prior to the time when every chip has absorbed sufficient liquor to complete the chemical reactions, causes evolution of sulphur dioxide gas and to that extent reduces the percentage of total and free sulphur dioxide in the solution. Such conditions may retard penetration and lengthen the cooking period.

5. The benefits of saturated bisulphite liquor can only be obtained if and when the required pressures are always maintained, or unless the temperature is correspondingly lowered with the pressure to maintain the solubility equilibrium of the sulphur dioxide.

6. The simplest and most efficient methods of recovering heat and chemicals from the digesters consist of direct recovery from one digester at a more advanced stage of cooking to another in an earlier stage of cooking, for this involves no transfer of saturated bisulphite solution to another container at less pressure with consequent loss of concentration of liquor. If in actual mill practice the cooking cycle cannot be so arranged that a freshly filled digester is available to receive the recoverable heat and chemicals, another digester for this purpose is the best type of accumulator. Actually such a condition has not yet arisen as the cooking schedules can be arranged to obtain the desired benefits.

American Writing Reduces Wages

Holyoke, Mass., December 29, 1931—The American Writing Paper Company Inc. last week announced a new wage scale calling for a reduction of approximately 9 per cent for all employees effective Monday of this week. President Sidney L. Willson in his formal announcement says there will be no further changes for at least one year. The wage schedule was drawn up by Adam Wilkinson, labor commissioner for the Company after a series of conferences between Eagle Lodge Papermakers, the Operating Engineers Union and Stationary Firemen's Union.

Mr. Willson's statement in full is as follows:

"The depressed business conditions during the past two years have made necessary many changes in the organization and operation of most business lines, which have been not only undesirable from the standpoint of the employee but most regrettable from the viewpoint of the employer. It has been a period when a friendly and cooperative spirit, which is so essential in human relations, has been much in evidence, and which now enables our company to look into the future with courage and hope.

"As evidence of a recognition of business necessity and illustrative of a cooperative spirit, after a series of conferences between representatives of Eagle lodge and Papermakers, International Union of Operating Engineers, International Brotherhood of Stationary Firemen, and Adam Wilkinson, labor commissioner of the American Writing Paper Company, Inc., a new wage schedule for the paper mills was mutually agreed upon. The new wage schedule is approximately 9 per cent lower than the present one and will become effective December 28. No further changes will be made in the wage rate for a period of at least one year. As it has been the custom in the past, practically all of the paper mills of Holyoke and vicinity will probably adopt the wage schedule.

"The following bulletin has been posted in all the mills of the company: Wage rates will be adjusted as follows: Number 1, employees receiving 75 cents or more per hour to be reduced six cents per hour; 2, employees receiving 74 cents to 46 cents per hour to be reduced five cents per hour; 3, employees receiving 45 cents or less per hour to be reduced four cents per hour; 4, overtime on week days to be paid for at time and one-half; 5, overtime on Sunday and following holidays, New Year's day, Memorial day, Fourth of July, Labor day, Thanksgiving day, Christmas day, to be paid at double time rates.

"Signed Adam Wilkinson,
Labor Commissioner."

"The following bulletin has been posted in all the mills business firms, corporations and individuals. It has been a period with thoughts of and for others have been applied with a Christmas spirit coupled with the business viewpoint. We are yet uncertain as to the future business conditions but it is to be hoped that improvement will be shown so that the present personnel in the organization may not only be maintained but increased."

(Signed) "S. L. Willson,
"President."

Section of the

COST DEPARTMENT

of the

American Paper and Pulp Association

Edited by Thomas J. Burke C. A. Director Cost Dept.

Beating Competition Through Group Activities *

By Charles F. Abbott[1]

It is a mistake to think that price fixing is the ultimate aim of stabilization. American business is volatile and requires greater freedom than would be permitted under any definite plan of price fixing. But that is no indication that we do not require greater stabilization in our marketing plans and I firmly believe that we can attain it effectively within the prohibitions of our existing laws.

Trade Associations are permitted to collect and disseminate information regarding production, stocks and shipments. They are permitted to establish standard methods of cost finding. In most of our trade practice rules we have gone on record as affirming the requirement that contracts shall specify quality as well as quantity, and we have made great progress in the fixing of standard sizes and uniform designations. Many of our cooperative organizations have insisted that disputes shall be settled under arbitration codes and that action be taken against bad practices, false invoice statements, and the like. Millions of dollars annually are being saved to industry in the sale of its products because trade associations have come forward, and to this limited extent at least have endeavored to stabilize marketing conditions.

Past Performance As A Guide

What we have done so far is merely an indication of the good work that can be done if these potential powers of cooperative effort are extended to their logical conclusion. We do not have to seek a new law nor ask for the modification of an existing statute to avail ourselves of these powerful aids toward stabilization. It is only necessary to win the support of the members of an industry to the work in hand.

Our strongest weapon is education. By hammering indisputable facts home again and again to every member of an industry the influences that promote price cutting can be reversed.

Education should start by destroying the illusion that greater profits can be obtained from an increase in volume secured by price cutting. When this illusion has been destroyed the root of the evil will be eliminated.

We can do much to effect this education through cooperation, through coming together and honestly discussing our problems. Around a conference table, in trade association meetings, this education is possible and without circumscribing the rights of individuals.

There was never a time when the important function of trade organization has been so definitely demonstrated as at present. Its stabilizing influences have been constantly at work during the period of recent depression and to a large extent it has prevented what might have been a far more serious situation.

The Association Method

Our industrial associations are mediums of reciprocal understandings. We rightly look to them to encourage efficiency and promote better relations, by broadcasting to the public the truth about our industries and the facts to which they are entitled. We must look to our organizations for new markets, for leadership in the elimination of waste, and the never-ending search for more economical methods of service and of distribution. Our cooperative associations are constantly casting their searchlights on the real problems confronting our industries.

In this country it is essential, nay it is legally required, that all trade associations be voluntary. Membership is determined upon the individual decision of each unit. There is no compulsion about it. Probably it is well, during a period of test and trial, that such should be the case for we are thereby prohibited from going up blind alleys. We are restrained from attempting cooperative efforts which are vicious, merely because they are not illegal.

But voluntary membership has given to trade associations a spirit, a complexion, that they would not otherwise have had. And it has limited the opportunities for good that might otherwise have been achieved sooner. If trade associations were recognized, licensed or sanctioned by the Government, there are many sociological functions that they might conveniently perform to the good of the public that they do not now perform.

Trade Associations must adopt programs of activities, which are obviously for the advancement of their members, if they are to win the support of those members. Their activities must be largely selfish. Only incidentally can they afford to be socially minded and offer cooperation with the government.

The Federal Reserve Board discovered this when it set up a bureau of economic research and sought the assistance of trades and industries in the gathering of statistics which would be valuable in credit studies. Only where such statistics were of value to the members of a trade association would the organization consent to gather them.

Politically we are just awakening to the fact that if we desire to organize trade and industry to maintain the wage

* Convention and Exposition Magazine.
[1] Executive Director, American Inst. of Steel Construction.

scale and to maintain employment, it is necessary to permit trades and industries to earn reasonable profits. I personally, do not believe the Sherman Law or any of the anti-trust statues since enacted, prohibit that form of trade cooperation, that is essential to achieve these ends. But the interpretations given by some political officeholders under those laws are such as to make the effort decidedly hazardous.

The day is fast arriving when the public at large will realize more fully and more clearly the fundamental necessity of insuring us against bankruptcies and improving the profit standing of those who engage in a business or an industry. And when the public realizes the necessity of this we may expect our politicians quickly to fall into step with the progress of economic organization.

It is highly desirable to alleviate human distress and to effect a more equable distribution of material goods. We can do much more in this direction with the agencies we now have and without upsetting the capitalistic principle upon which our business is based. But we must not forget our fundamentals.

Business exists for making profits. When profits disappear, business likewise disappears. The satisfaction of labor working for an adequate wage, of the consuming public for an adequate supply of goods at reasonable prices, of the investor for a return on his money, of the government for an unimpaired source of tax returns, are all dependent uniformly upon the profitable operation of business. This problem of earning a profit, however, is properly left to the discretion of business management. Consequently, management is in duty bound to apply scientific thinking and planning in effecting better methods for the stabilizing of business prosperity.

Every business enterprise is fundamentally a public service undertaking. It can make good and should be allowed to exist only in proportion as it recognizes the public character of the function it is performing. One of these functions is that of treating its customers alike, relieving them of the necessity of bargaining, and thus allowing them to exert their full economic strength. Uniformity of prices and of treatment until the time comes when there is reason for a uniform change, with full publicity for the facts, is the course upon which the interests of all can be reconciled—and the only one.

Profit—The Business Cornerstone

The whole structure of business is based upon profit and not upon the mere production or exchange of commodities.

Every factor in the industry should cooperate to this end, whether he be the manufacturer, the wholesaler, or the retailer. Their interests are basic—that of producing, selling and distributing—and to succeed all must do so on a reasonable profitable basis. The big problem is for the manufacturer to recognize his rightful position of leadership.

It is obvious that the problem of the distributors becomes the problem of the manufacturers. On the other hand, the distributors cannot expect to profit unless they, on their part, extend to the manufacturers that degree of efficient distribution which it is reasonable to expect. It is only through this recognition of the vital necessity of group conferences on the part of manufacturers, jobbers and retailers representing an industry that unfair, unethical and unsound trade practices can be eliminated. It should be clearly recognized by all that the manufacturer cannot profit at the expense of the jobber or the retailer, and vice versa—the jobber or the retailer cannot profit by pursuing methods contrary to the defined policy of the manufacturer.

The buyer and the seller are as dependent upon each other as are the producer and distributor of the product. In the long run, buyer and seller alike will be adversely affected by an influence which undermines the stability of the other. The best assurances for the consistent prosperity and progress of both, and of American business as a whole, lies in active cooperation to foster such constructive influences and stamp out those, such as price cutting, which are responsible for destructive competition and that menace the welfare of all concerned.

It is not the lawful reduction of prices that I condemn. We must recognize the ethical distinction between necessary price reductions and price cutting, which is inspired by a selfish desire to obtain more than a reasonable proportion of business.

Not Illegal Price Cutting

Prices that are reduced to dispose of excess inventories or to meet emergency conditions confronting a producer would not, and should not, be classified as illegal price cutting.

On the other hand, prices that are cut for the purpose of taking business away from others who may be entitled to it, is an objectionable form of price cutting. Under the spirit of the Clayton Act such practices, I firmly believe, are illegal. Cut prices to attain more than one's share of business or to obtain business on a price basis alone is another form of price cutting that is reprehensible. To submit one price, only to return and submit three or four additional and lower prices, thereby starting a price cutting orgy, represents a vicious form of price cutting.

The Clayton Act plainly condemns price discriminations which are designed for the purpose of lessening competition. The idea behind the Federal Law is in line with what we all believe in, and I feel confident that we could cure the evils of price cutting today were we not likely to lose our way in the morass of legal technicality that so often follows when we depend entirely upon the courts to correct economic evils.

The Anti-Trust Laws, with some of their now obsolete interpretations and many doubtful regulations under them, are probably responsible for some of the business man's worries. A modification of these laws with intelligent interpretations would undoubtedly offer relief; but by no means are they alone responsible for the new conditions now confronting our business activities, nor would their repeal remove the principal present day problems.

The argument of such a revision is valid in itself for the Anti-Trust Laws were enacted to prevent restraint of trade rather than to forbid all trade agreements. Therefore, trade agreements which have for their purpose the conservation of a product for the best interest of the public or the saving of an industry would not necessarily come under the prohibition of the intent of the framers of the statutes. It is becoming more and more apparent that production in important fields has outgrown many of the rulings under the Anti-Trust Laws.

A Principal Evil

While modifications are undoubtedly necessary, it is well to remember that extreme selfishness on the part of some at a disregard of the rights of others represents a principal evil. Until individual selfishness can give way to justice and fairness with the spirit of the industry of paramount importance, we cannot expect any relief even though the laws might be modified. It is only through honest cooperation that enlightened selfishness can possibly dissipate ignorant competition which is our real hazard.

Beating and Freeness Tester Improvements

The well-known beating and freeness tester Schopper-Riegler (patented) has been recently equipped with an additional contrivance. The conical valve, which previously was lifted by hand, is now actuated by a mechanical lifting device for obtaining testing results of higher uniformity. A full description of the apparatus, together with directions for the tests, follows:—

In the manufacture of paper, the pulp, consisting of water and fibers, is put on a mesh through which the main part of the water drains off immediately at lower or higher rate. The rate of drainage depends upon the condition of the fibers, their kind, fineness and soaking state, and upon the quantity and condition of fillings, glue, etc., added to the pulp. The more the fibers are worked up mechanically, *i.e.*, the more they are reduced by beating, calendering, crushing, etc., the lower the rate of drainage of the water. Thus, the rate of drainage allows us to infer the state of reduction or the degree of beating given to the pulp.

The quality of paper to be made depends to a large extent upon the degree of beating imparted to the pulp. In order to assist the papermaker to repeat the quality of paper it is necessary that he should have some definite data to work upon. This can be realised best by means of the Schopper-Riegler beating and freeness tester. The apparatus is so arranged that the beating degree and the drainage capacity can be quickly and accurately determined. The tests can be made so quickly that it is possible to follow up closely and continually the action of a beating engine or any other disintegrator on the pulp. The testing results so obtained enable the beaterman to stop the beating process as soon as the pulp has reached the degree of fineness which is, according to the practice, most suitable for the paper to be manufactured. The question of determining the condition of the fibers, however, is an important one, not only for the mixed pulp under treatment in the beater, but also for the different kinds of fibers which have not yet undergone any preparation, such as cellulose and mechanical wood pulp. For this kind of paper stock, the testing results often furnish valuable data with regard to the best use to be made of it and the most appropriate working method to be applied. The apparatus is indispensable for laboratory tests of the strength of pulp stock, as the strength figures found by such tests are of value, and comparable only if they can be put in relation to a certain numerically established condition of the fibers.

By making use of the Freeness Tester equipped with the new device for mechanically lifting the conical valve, and by strictly observing the directions for use, every one will obtain reliable results not subject to individual influence.

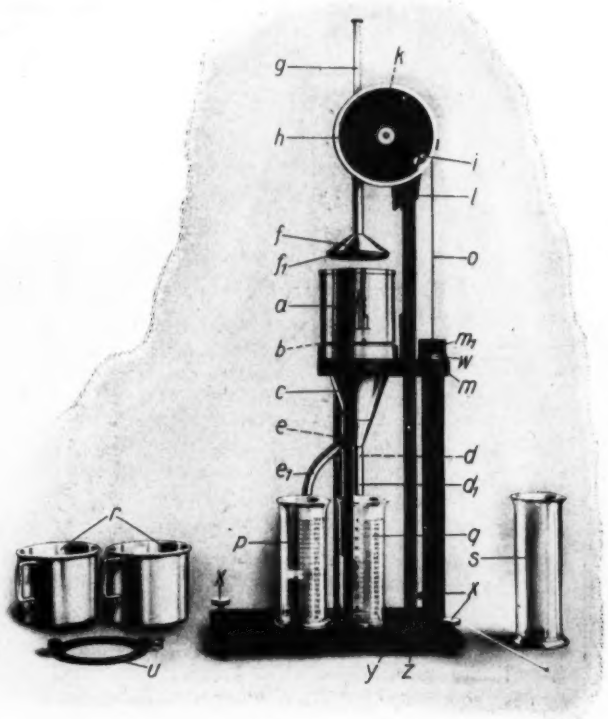

FIG. 1

A. Working Method of the Schopper-Riegler Beating and Freeness Tester

A pre-arranged quantity of pulp is mixed with a 1,000 cub. cm. water at 18 to 20 deg. C, and the whole is poured on a wire mesh 100 sq. cm. in size. The quantity of water passing through the mesh and through the pulp film forming upon it is collected and led into two different measuring vessels, so that the water of quick drainage, before the pulp film is formed, flows into one beaker, whereas the later slowly dropping water runs into the other vessel. The vessel containing the quick draining water only is used for reading off the testing result. It is provided with two graduations, the one divided into 100 points (zero at the top), indicating the beating degree, and the other (zero at the bottom), showing in cub. cm. the quantity of quick drainage water, *i.e.*, the freeness or drainage capacity.

The second beaker containing the water of slow drainage, is provided with the same graduations as the first. It is not necessary, however, to read off the height of water in it for determining the beating degree and the freeness (rate of drainage).

B. Description of the Beating and Freeness Tester

A standard with a foot holds a funnel-shaped separator *c* (see Fig. 1), with two outlets *e* and *d* and discharge pipes *e1* and *d1*. On the separator is arranged a receiver *a*, which is fitted with a sieve *b* of definite area with meshes of definite width. A conical valve *f*, with packing *f1*, can be fitted into the receiver for tightening up this latter against the seperator, so that the pulp mixture can be poured in before the test.

The active force of a falling weight is used for lifting the conical valve out of the receiver. For this purpose the valve is fitted with a rack and pinion gear system (rack *g* and pinion *k*). The toothed wheel is firmly connected with a pulley *h*, over which passes cord *o*. The free end of the cord bears the two counter-weights *m*—*m1*. In the starting position the counter-weights are arrested by a catch, so that they cannot fall. As soon as the weights are released by shifting down stop lever *l* they begin to move downwards owing to their mass being heavier than that of the conical valve *f*, together with the pulp in suspension stocked above the cone. The conical valve is lifted; the speed of the lifting stroke (due to the action of the pulp in suspension flowing

along the conical valve) would increase continually, but to avoid this one of the counter-weights *m1*) after a certain length of fall, is prevented from falling further by a rubber washer *w*, on which it comes to rest. Thereby, the falling motion with increasing speed is transformed into a fall of nearly uniform rate. Weight *m*, which when at rest, counterbalances the weight of the conical valve, continues falling, and is caught by a buffer the moment the valve has reached its top position. After the test, the conical valve is again put down on its seat in the receiver *a* by turning handle *i* of the pulley *h* counter-clockwise until the stop engages. Cord *o* is coiled at the same time on pulley *h*, and the counter-weights *m*—*m1* are raised up to their highest.

C.—Fitting Up the Apparatus

The apparatus must be adjusted accurately before using it for regular tests. For this purpose, three levelling screws *x* are provided in the bedplate, and a plumb bob *y* with counterpoint *z* are fitted to the standard. The condition of the mesh and the orderly state of the outlets can be checked by establishing the so-called water standard of the apparatus. This is done by proceeding as follows. The apparatus is arranged as for a regular test. The receiver is filled with 1,000 cub. cm. of boiled water at 20 degs. C. The conical valve is lifted. The water passes through the mesh into the separator and is collected partly in vessel *p* and partly in vessel *q*. If the mesh and the outlets are in order, 960 cub. cm. of quick water will pass into vessel *p* and 40 cub. cm. of slow water into vessel *q*. The time of drainage from the moment the valve is lifted to the end of the test is 8 seconds.

D.—Sampling and Preparation

The sample required for the test, which should be equal to 2 grams of bone dry pulp, can be taken in different ways.

If the percentage of concentration (ratio of water and pulp) in the beater is known, the correct sample is taken by means of a suitable dipper, the capacity of which is adequate to the pulp consistency, so that it contains the prescribed quantity of pulp when filled up to the rim. The pulp jutting over the rim is removed by a glass stick passed over the rim of the dipper. Care should be taken that no air bubbles are in the dipper; otherwise the measured quantity of pulp would be below standard.

For pulp of unknown consistency, the sample is prepared by scooping a small quantity of pulp out of the beater by means of a strainer and by pressing out the water by hand.

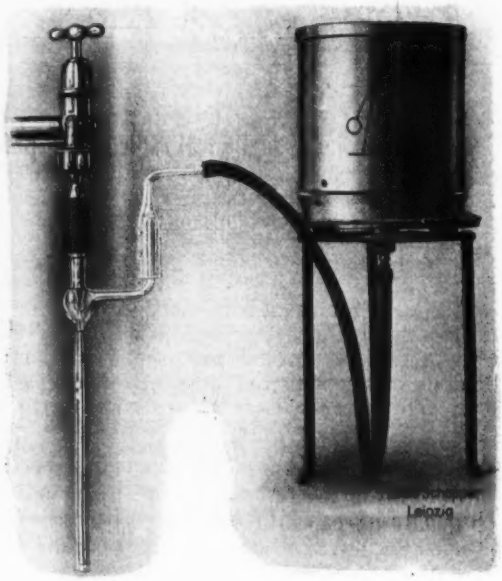

FIG. 5

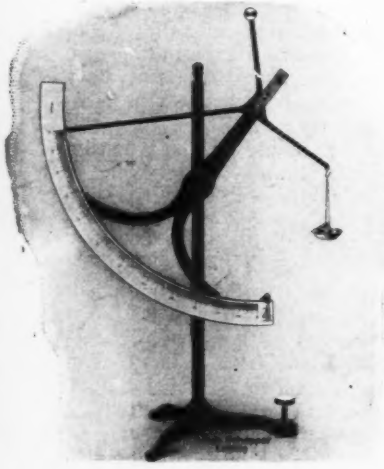

FIG. 2

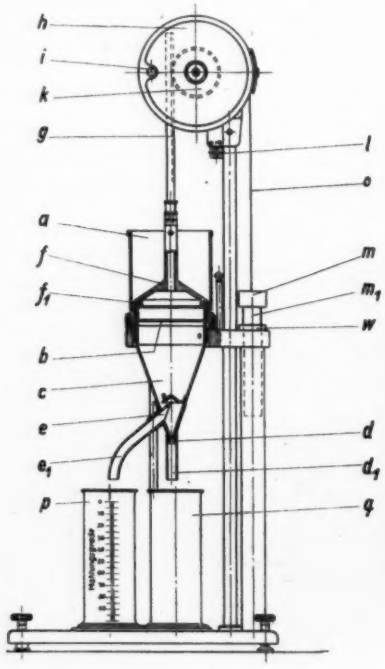

FIG. 3

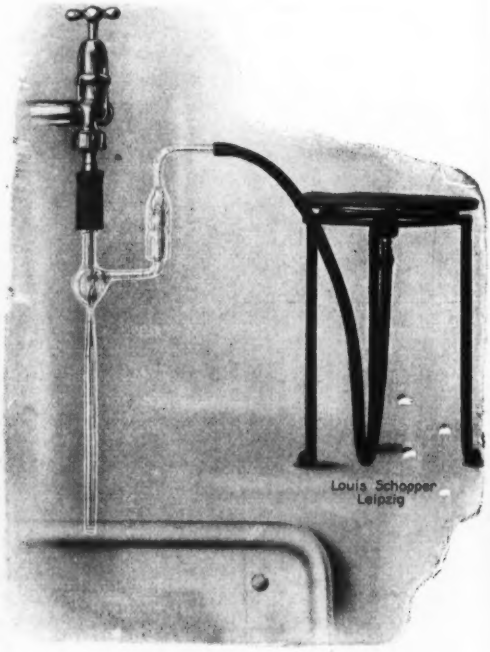

FIG. 4

It is known from experience that, by proceeding this way, the pulp can be squeezed out to such an extent that its bone dry weight is approximately one-third of the weight of the wet stuff. A quantity of 6 grams weight of the so prepared pulp is then used for the test. For weighing this sample use preferably a scale as per Fig. 2.

The sample obtained in this way is put into beaker *s* and twirl in about 200 cub. cm. water until all flakes in it are well dissolved. Water at 18 to 20 degs. C. is then added until the suspension is on accurate level with the 1,000 cub. cm. mark of the preparatory beaker. In order to avoid loss of fillings or dead beaten fibers use also the water drained off in the squeezing operation for filling up the sample. Then pour the whole test sample into one of the mixing pots *r* and decant it several times from one mixing pot into the other until the fibers are uniformly dispersed in the water.

E.—Testing Process

As soon as the sample is mixed it is poured into the receiver *a* of the Freeness Tester with its conical valve *f* seated (see Fig. 3), and the stop for counter-weights *m-m1* is instantly released, whereby the conical valve is lifted automatically. The pulp in suspension passes into the lower part of the receiver, of which sieve *b* forms the bottom. The fibers deposit on the sieve as a uniform sediment, whilst the water drains off through the pulp sediment and the sieve into separator *c*. It leaves the separator through outlets *e—d* and flows into measuring vessels *p—q*. The quantity of water flowing off through the one or the other outlet depends on the condition of the tested pulp. The water drains off quickly from raw beaten or "coarse" pulp and its main part is collected in measuring vessel *p*, whereas it drains off slowly from wet beaten or "greasy" pulp, its main part being collected in vessel *q*. The beating degree or freeness is determined in every case by measuring the quick drainage water only in vessel *p*, which is provided with a red division for reading off beating degrees.

F.—Directions for Making Test

1. Adjust the apparatus carefully and accurately. Check sieve *b*. Moisten sieve *b*.
2. Set receiver *a* on separator *c*.
3. Set conical valve *f* on its seat by turning handle *i* of pulley *h* until the stop engages.
4. Take the sample (see paragraph D. Sampling and Preparation.)
5. Pour the sample into preparatory vessel *s*, twirl it in 200 cub. cm. water and add water of 18 to 20 degs. C. up to the 1,000 cub. cm. mark of the preparatory vessel accurately.
6. Measure the temperature of the pulp in suspension and note it.

FIG. 8

7. Pour the diluted sample into one of the mixing pots *r* and decant it several times in the two mixing pots until the fibers are uniformly dispersed in the water.
8. Pour the sample carefully into receiver *a* of the Freeness Tester.
9. Lift immediately the cone valve by shifting down stop-lexer *1*. The water drains off and flows into measuring vessels *p—q*.
10. When no more water flows out of discharge pipe *e1* read off the beating degree on vessel *p* and note the figure.
11. Remove receiver *a* and take the pulp off the sieve.
12. Empty measuring vessels *p* and *q*.

For further tests repeat operations 2 to 12.

G.—Correction of the Beating Degree in the Case of Samples of No Correct Quantity

The result of the beating or freeness test depends upon the quantity of pulp used for the test. Therefore, it is necessary to check the weight of the sample afterwards and to correct the beating degree established by the test.

This is done by applying the following method:—

First of all one part of the water still remaining in the pulp cake on sieve *b* of receiver *a* is drained off by means

FIG. 6

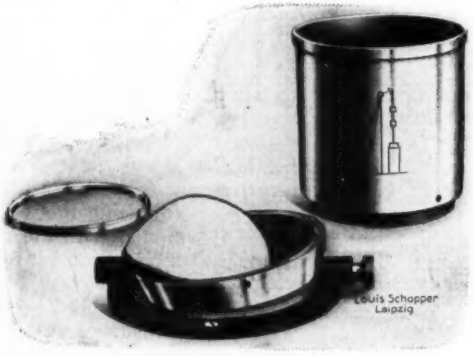

FIG. 7

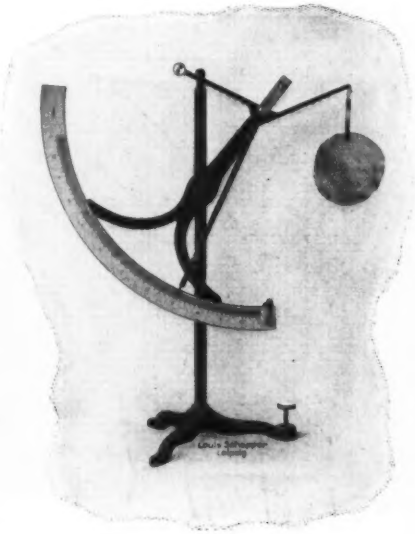

FIG. 9

of a suction appliance as per Fig. 4. The suction apparatus consists of a plate with a hole in the middle, which is connected to a water-jet pump by means of a rubber hose. This plate is covered by a felt, and the receiver of the Freeness Tester is placed thereupon as shown in Fig. 5. As soon as the water cock is opened, the pump sucks air through the hose and the pulp cake, and at the same time one part of the water from the pulp. Partly dried pulp cake is then detached from the sieve and taken out of the receiver. For this purpose, the apparatus is furnished with a grip ring as shown in Fig. 6. The receiver *a* is inserted into the grip ring so that the pin and the spring plunger engage into two opposite holes of threaded bottom ring of the receiver. The top part of the receiver can be detached from the threaded ring by unscrewing it left-hand, so that the sieve with the pulp cake is freed. Then the seive with the pulp cake can be removed easily as shown in Fig. 7. The pulp cake is couched down from the sieve on blotting paper or on a felt and placed in an oven for drying. Fig. 8 shows a suitable drying oven. The drying temperature should be about 100 to 105 degs. C.

When the drying process is completed the weight of the pulp cake is ascertained by means of a scale as per Fig. 9. This scale is the same as that shown in Fig. 2 for weighing the wet sample, with the sole difference that a clip is used instead of the pan. If the result is required to be of the greatest accuracy, it is necessary to consider the weight of the fiber particles and fillings which have gone through the sieve. For this

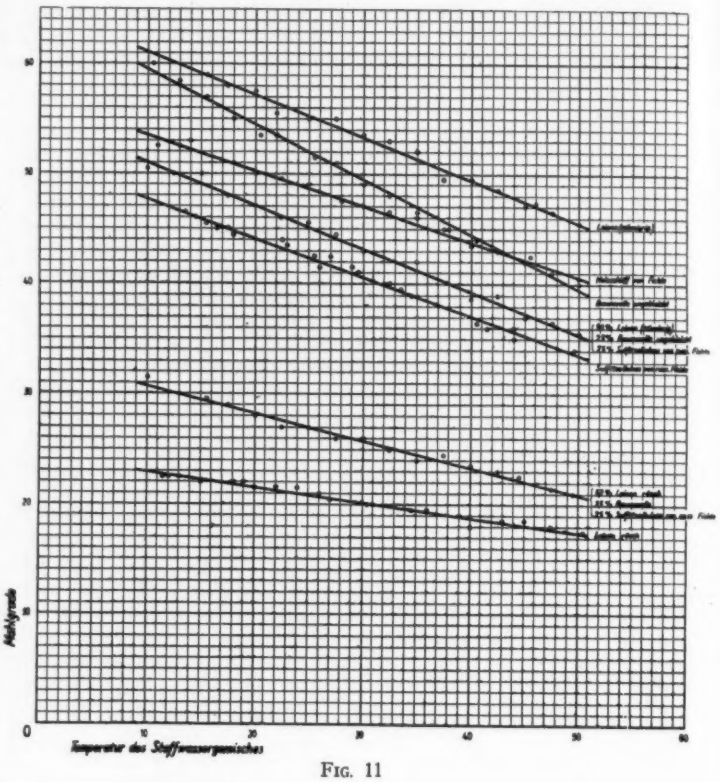

FIG. 11

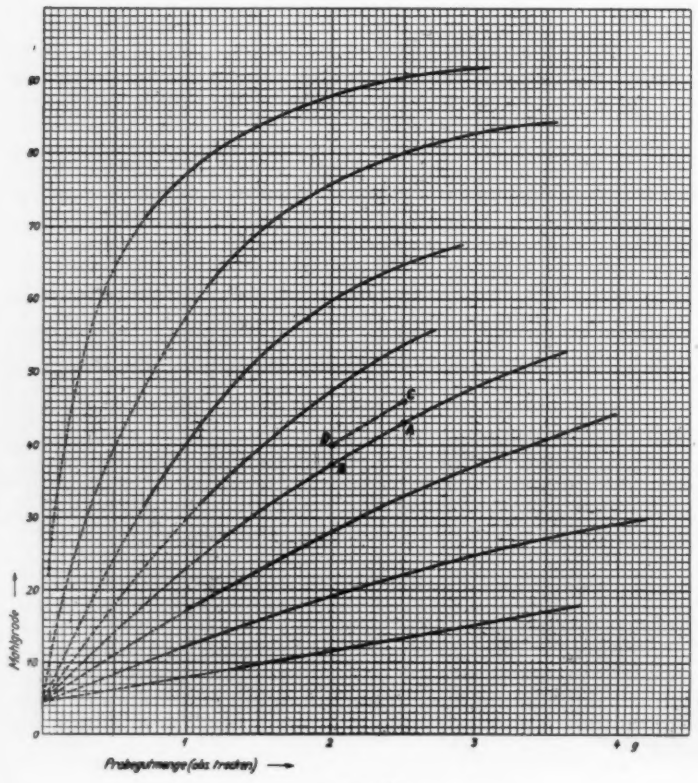

FIG. 10

purpose let them deposit, decant the limpid water and pour the remainder on a weighed filter. Then dry the filter with its contents, deduct the weight of the filter, and add the remaining weight to the weight of the pulp cake. The result is the accurate quantity or weight of the pulp sample.

The weight of the fibers and fillings collected on the filter gives at the same time an idea of the loss of fillings and fine fibers which will occur in the run on the machine

If this checking test shows that the actual weight of the sample differs from what it should be, the beating degree can be corrected in accordance with the correction table shown in Fig. 10, which has been worked out by Prof. Dalén of the Bureau of Standards of Berlin-Dahlem.

The diagram shows in the ordinate the beating degrees and in the abscissa the weights of the samples. The application of these curves for correcting the beating degree is explained by the two following examples:—

Example 1.—Supposing the beating degree read off the measuring vessel *p* be 43 and the weight of the bone dry pulp cake be 2.5 grams. Point *A*, in which the ordinate of beating degree 43 is intersecting the abscissa of the sample weight 2.5 grams, lies on one of the curves shown in the table. The beating degree is then corrected by following this curve up to the point of intersection *B* with the 2 grams abscissa. This point of intersection between the ordinates 37 and 38 indicates the corrected beating degree 37.5.

Example 2.—The beating degree read off the measuring vessel *p* is 46 and the weight of the dried pulp cake is 2.5 grams. Point of intersection *C* of the co-ordinate belonging to there fig-

ures lies between two of the curves shown in the diagram. In this case an imaginary line is drawn parallel to the next curve. The corrected beating degree results from the ordinate figure of the point of intersection *D* of the imagined line with the 2 grams abscissa. In the case of this example the beating degree is 40.

H.—Influence of the Temperature of the Pulp in Suspension on the Test Result

The temperature of the pulp in suspension under test should be 18 to 20 degs. C. The result of the test depends on the temperature of the sample. The heating degree is higher at a low temperature and lower at a high temperature. The differences between the results are only small at temperatures of 18 to 20 degs. C. and hence can be neglected. At temperatures exceeding or keeping below these limits, the established beating degree must be corrected. Yet the correction depends on circumstances.

The diagram Fig. 11 shows dependency lines of the beating degree from the temperature of the pulp in suspension for various stuffs.

The table shows that the dependency line can be supposed to be a straight one, which, however, can be of different inclination to the axis of the abscissa according to the kind of pulp and its beating degree. The influence of the beating degree is shown up very distinctly by the two dependency lines for "linen raw beaten" and "linen wet beaten."

As clearly shown from the preceding lines, an exact correction of a beating degree obtained at a temperature, which differs from the standard, can be made only under the condition that the temperature dependency line was established for the particular case of the stuff in question. Therefore, in order to avoid trouble of this kind, it is advisable to keep the temperature of the sample always within the limits of 18 to 20 deg. C.

J.—Special Remarks

1.—TAKING OFF THE PULP CAKE FROM THE SIEVE.

The method described in paragraph *G* can be applied, if the quantity of pulp is to be checked afterwards. If no control of this kind is required, the pulp is simply washed off the sieve. This can be done by a water jet thrown on the underside of the sieve or by dipping the receiver into a bucket or tub filled with water. The pulp cake is thereby detached from the sieve.

2.—THE SIEVE.

The Sieve is one of the efficient parts of the apparatus, and care should be taken that it be always clean and fit for service, and that it be exchanged in due time. If the apparatus is not in use for a long time, the sieve should be kept in a dry place. It should be carefully cleaned before drying. For use in further tests the sieve should be watered and washed under a strong water jet. No greasy or oily water should be used for this pupose.

If the tests are interrupted for a short time only (a few hours), the sieve should be kept wet meanwhile. For this purpose the receiver is put into one of the mixing pots, which is partly filled with water.

One spare sieve is supplied with the apparatus. Only smooth and not crumpled sieves should be used for the tests. When putting a new sieve in position care should be taken that no free space be left between the sieve and the grip-ring, so that the pulp under test cannot adhere to it.

Proportions of Standards Sieves:—

Thickness of tissue		0,40 mm.
Thickness of wire	weft	0,17 mm.
	warp	0,16 mm.
Number of meshes	weft	24 per cm.
	warp	32 per cm.

3.—OUTLETS.

Care should be taken that the outlets *c* and *d* are clear. Outlet *d* is a fine nozzle bore. The free passage of this nozzle should never be obstructed by heterogeneous particles, as incorrect beating degrees would result. Therefore, the nozzle should be checked from time to time. In order to avoid expanding the nozzle section, only small sticks of soft wood should be used for cleaning the nozzle.

4.—MEASURING VESSELS.

It is advisable to use gauged measuring vessels only for measuring the drainage water.

K.—Summary

The high value of the Schopper-Riegler Beating and Freeness Tester (patented) lies in the fact that it suits equally well for testing all kinds of half-stuffs (rags, cellulose, mechanical wood) and all mixed stuffs incuding the substitutes and filings used in finished pulp.

The apparatus furnishes reliable numerical values allowing one to predetermine how the paper stuffs will behave on the wire of the paper machine. At the same time it shows the loss of fillings and the quantity of dead beaten fibers and flour, which escape through the sieve.

Owing to the short time required for a test the beating process in beating engines and ball mills and the work of grinders can be controlled and checked continually. The papermaker can appoint the most appropriate beating degree for a certain kind of paper and can instruct the beaterman or the ginder to keep to the prescribed beating degree.

This beating and freeness tester is handled exclusively in the United States and Canada by Testing Machines, Inc., who will be pleased to furnish any additional data desired.

Paper Products Accidents

The New York State Department of Labor has just issued a study of accident prevention in the paper products industry. Visits were made to the scene of each accident; the cause was determined with a view to prevention. Many of the workers injured were employed less than a year and a remarkably high rate of machine accidents was found.

This monograph includes plants manufacturing paper boxes, loose leaf and blank books, paper bags, photo mats, envelopes, paper novelties, die cuttings or "cut-outs", corrugated paper and boxes and other paper products. Similar studies have been made on food products, hand tools, the paper and pulp industry, and metal stamping and forming plants.

The study was made by Herbert L. Reid, safety inspector of the Division of Industrial Hygiene. The monograph aims to prevent injuries by providing practical methods of prevention in order to promote economical plant operation.

Safety rules, as a result of this investigation, have been provided to cover the prevailing causes of accidents.

The monograph which is entitled, "Accidents in the Paper Products Industry", can be obtained by writing to the Division of Industrial Hygiene, 80 Centre street, New York.

Colorado Paper Products Co. Gets Stock

[FROM OUR REGULAR CORRESPONDENT]

DENVER, Col., December 23—Judge E. V. Holland in the district court here instructed the International Trust Company to deliver $209,000 of the Colorado Pulp and Paper Company stock to the Colorado Paper Products Company present occupants of the plant who were previously declared to be the legal owners of the stock.

Obituary

Alonzo Aldrich

Alonzo Aldrich, for forty-two years president of Beloit Iron Works and one of the most outstanding figures in the development of paper making machinery, passed away on Sunday morning, December 20, at nine o'clock in his hotel at Cleveland, Ohio. He was born at Logansport, Ind., in 1858. Owing to a heart trouble, for about five years Mr. Aldrich has not been able to take an active part in the business. He is survived by one sister, Mrs. James Lamb, Pasadena, Cal., one daughter, Mrs. E. H. Neese, and four grandchildren. He was buried in Beloit on Wednesday, December 23. The pallbearers were all old employees of Beloit Iron Works who have been closely associated with him for many years.

He was chief engineer for the Merrill & Houston Iron Works, which was established to build paper mill machinery in 1858 and which in 1885 became the Beloit Iron Works. In 1889 he was elected president of the Beloit Iron Works, which office he has held without interruption until the time of his death. Under his direction the business became outstanding in the United States, also entered the foreign field, having supplied paper mill machinery to Japan, China, Australia, Germany, Finland, England, Canada and Mexico.

Mr. Aldrich has been the originator of some of the most important developments in recent high speed paper making machines. Scores of patents have been issued him for devices which have revolutionized the paper making industry. Under his leadership the Beloit Iron Works grew rapidly and has continued to maintain this leadership through all the years of Mr. Aldrich's incumbency as president of the corporation.

He was loyal in the extreme to the men of the Beloit Iron Works. He knew the employees in the relationship of fellow workmen and he was always interested in their problems and anxious to be helpful in their difficulties. He was a man of many, but unobtrusive, generosities. Illustrative of this characteristic is the fact—known only to a few—that recently Mr. Aldrich financed an important research work carried on in the field of cancer, under which more than fifty patients are receiving the attention of a noted specialist who is spending his entire time in an effort to ameliorate this scourge.

He was a man who by nature possessed the rare combination of inventive and business ability, thus under his leadership the Beloit Iron Works has been guided to its present high standing.

Mr. Aldrich was also an artist of no mean ability, having had some of his work displayed in the Academy in Paris.

The Beloit paper machine on exhibit in the World's Fair at Chicago in 1893 was the result of his efforts and was considered the greatest advance in paper making machinery ever produced up to that period.

Robert G. Thornton

RICHMOND, Va., December 26, 1931—Robert Grammar Thornton, president of the Virginia Paper Company and widely-known business man, died December 18 at St. Elizabeth's Hospital after a long illness. He was 75 years old.

Born in Halifax County on August 12, 1856, Mr. Thornton was the son of the late Richard Thornton and Elizabeth Priscilla Grammar Thornton. His grandfather, John Grammar, was an Episcopal minister of Petersburg, who was credited by Bishop Meade with aiding materially in keeping the Episcopal Church in existence in that city.

Mr. Thornton was educated in private schools and at the United States Military Academy at West Point. He had been engaged in the paper business about fifty years. He worked for years for the old Richmond Paper Manufacturing Company. While with them he travelled over the entire United States. In that way he became acquainted with virtually all of the older men now engaged in the paper business. For years he was general manager of that concern.

In 1914 he and his associates, D. M. Blair and W. C. Scott, organized the Virginia Paper Company. Due to his signal knowledge of paper, both in the manufacturing and selling end, this company has become one of the outstanding distributors in the South. The main office of the company is in Richmond, Va. Branches are maintained in Washington, D. C., and Jacksonville, Fla. In addition to these facilities, paper is also stored in public warehouses in Norfolk, Va. and Atlanta, Ga.

Mr. Thornton was especially sympathetic towards young salesmen and was always eager to help them by sharing his great knowledge with them. Notwithstanding the many changes that have occurred in recent years in the distribution of paper, he was always in the forefront, never lagging behind.

He was junior warden of All Saints' Church, a member of the Commonwealth Club, the Country Club of Virginia, and the Sons of the American Revolution.

He is survived by his widow, who was Miss Camilla Presley Tuggle of Nottoway County; a niece, Mrs. W. C. Scott of Richmond; a nephew, Robert E. Thornton of Denver, Col.; a great-niece, Mrs. Singleton Belt, and a great-nephew, Robert Thornton Scott, both of Richmond.

William F. Brunner

William F. Brunner, president of the Paterson Parchment Paper Company, Passaic, N. J., died suddenly of a heart attack in his home at the Hotel Suburban, East Orange, N. J., aged 71. Mr. Brunner had not been ill and the news of his death came as a shock to his business associates in Passaic and New York City.

Funeral services were held at the First Presbyterian Church. The Board of Trustees of the church were honorary pallbearers and the Board of Deacons and Session attended in a body. Clayton P. Stevens, organist, rendered music for the services and Miss Margarete Steffner sang.

Burial was in Hillside Cemetery.

James L. Coker

HARTSVILLE, S. C., December 23, 1931—James L. Coker, president of the Carolina Fibre Company and oldest son of Major James L. Coker, founder of Coker College, died here today of a heart attack at the age of 68.

Mr. Coker was a pioneer in the paper manufacturing industry in the South. He was the inventor of machines and processes for paper manufacturing. He is credited with having been the first to establish the process of manufacturing paper from yellow pine. He was a graduate of Stevens Institute of Technology at Hoboken, N. J.

Wall Paper Standardization

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 30, 1931—Announcement has been made by the Bureau of Standards that the commercial standards of the wall paper manufacturers which has been in force has been reaffirmed for a period of one more year. The new agreement ends August 1.

Union Screen Plate Company

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Rolled Phosphor Bronze and Copper Plates for Rotary Screens

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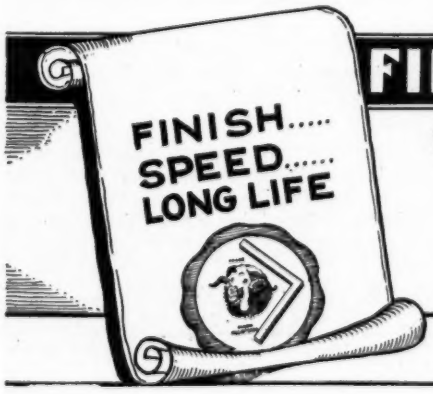

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SKANEATELES FALLS, N.Y.

WEYERHAEUSER PULP MILL BEGINS OPERATING

(Continued from page 11)

and caliper control mechanism, a sheet of constant caliper, basis weight and moisture content is passed in to the Minton vacuum dryer for final drying.

The Minton vacuum dryer operates under 28 inches of vacuum, the 36 60-inch drying cylinders being completely housed in an air-tight metal chamber. Under vacuum, the water may be evaporated at very low temperatures. Excessive heat is detrimental to the physical and chemical characteristics of pulp. Being able to dry the water out of the pulp at the low temperature mentioned above, protects the finished product from a process of deterioration. The pulp, while being dried in the vacuum dryer, is protected from circulating dust laden air currents, further protecting the clean pulp from contamination. As a further precaution in the interest of cleanliness, all air admitted to the machine room is washed and filtered.

Packaging and Storage

The pulp coming from the vacuum dryer is cut into sheets 30 inches square and built into bales of exactly 400 pounds each on scales at the end of the cutters. The 400 pound bales are passed to hydraulic presses and automatically compressed to a given cubical content. From the presses the bales are wrapped and tied, being tied by automatic wire tying machines.

From the tying machines, the bales are check weighed and taken to the large 165 by 280 foot dust proof pulp storage warehouse for rail and water shipments.

Experienced Personnel

From the four corners of the pulp and paper industry, figuratively speaking, the men who are charged with the management, supervision and operation of the pulp division of the Weyerhaeuser Timber Company were drawn. They came from the New England states, the middlewest and points in the Pacific Northwest to form a new organization in Longview. With an ultra-modern plant at their disposal, their aim is to produce the highest possible grade of bleached sulphite pulp for the paper trade.

R. B. Wolf is manager of this new pulp division of the Weyerhaeuser Timber Company. Mr. Wolf had been for the past seven years, president of the Pulp Bleaching Corporation of New York. Numbered among his earlier activities were the superintendency of the sulphite mill of the Union Bag and Paper Company at Hudson Falls, N. Y.; general manager of the Burgess Sulphite Fibre Company (now the Brown Company), Berlin, N. H.; general manager of the Spanish River Pulp and Paper Mills, Ltd., at Sault Ste. Marie, Ont.

During the war Mr. Wolf was assistant to Vice President Piez of the Emergency Fleet Corporation at Washington, D. C. He brings to his present position a rich fund of practical experience and human understanding.

Ben Larrabee, superintendent of the Weyerhaeuser pulp mill, came to Longview in May of this year and was active at the mill during the construction period. For many years he was associated with the S. D. Warren Company at Cumberland Mills, Me., in the capacity of superintendent of their sulphite mill. In 1929 the S. D. Warren Company discontinued the manufacture of sulphite pulp and at that time Mr. Larrabee came west to take the superintendency of the Olympic Forest Products Company's mill at Port Angeles, Wash., his last location before coming to Longview.

Mr. Larrabee was given national recognition in the industry by being chosen president of the Superintendent's Association of the American Pulp and Paper Industry for the year 1929.

Norman Kelly has spent ten years in the pulp and paper industry on the Pacific coast. He is now assistant superintendent at the Weyerhaeuser pulp mill. Mr. Kelly came to Longview from the Grays Harbor Pulp and Paper Company of Hoquiam where he was sulphite superintendent. Prior to that he was with the Washington Pulp and Paper Company at Port Angeles.

Ralph Hansen is technical director in the new pulp mill. Hansen is a University of Washington graduate who later worked under Dr. Benson in the chemical engineering department of the university. His next connection was with the Rainier Pulp and Paper Company at Shelton where he remained for three years as chemist. He was transferred to the Olympic Forest Products Company at Port Angeles as chief chemist, and comes to Longview from that position.

Paul Miescke, office manager at the pulp division offices, is a University of Washington graduate. He was at one time connected with the lumber company offices in this vicinity. Later he was accountant at the Port of Longview for two years. He recently came from the Fir-Tex Insulating Board Company at St. Helens, Ore.

Edward Wood is operating chemist of the Weyerhaeuser Timber Company's pulp division. Previous to this he was chief chemist for the St. Regis Pulp and Paper Company at Tacoma. He was at one time superintendent of the Oregon Pulp and Paper Company's sulphite mill at Salem, Ore., and before that for a period of several years connected with the Stebbins Engineering Company in India.

To represent the Weyerhaeuser pulp division in eastern and midwestern territory, G. S. Brazeau and Henry F. Bigelow, Jr., will make their headquarters at offices in Chicago and Clinton, Mass., respectively. Mr. Brazeau came to Weyerhaeuser from the Northwest Paper Company of Cloquet, Minn. His Chicago office will be at 307 North Michigan Avenue. Mr. Bigelow was formerly associated with Atterbury Brothers, Inc., of New York.

Others in the operating department of the mill include H. R. Heuer, foreman, who came to Longview from Newton Falls, N. Y., where he was connected with the Newton Falls Paper Company. Prior to going east Mr. Heuer was associated with the Hawley Pulp and Paper Company at Oregon City, Ore.

Walter Clough is night superintendent at the Weyerhaeuser pulp mill. He was with the S. D. Warren Company at Cumberland Mills, Maine, before coming to Longview.

Arthur Blair, master mechanic, was with the Washington Pulp and Paper Corporation at Port Angeles and later with the Olympic Forest Products Company as master mechanic before he came to Longview.

Charles Walton, pipe foreman, was in Hoquiam with the Grays Harbor Pulp and Paper Company and prior to that associated with the Rainier Pulp and Paper Company at Shelton, Wash., before joining the Weyerhaeuser pulp organization.

The Northwestern Paper and Mercantile Company, Inc., Detroit, Mich., has been incorporated by Philip Kaplowitz, 4702 Tireman avenue, Detroit, to deal in paper products of various kinds.

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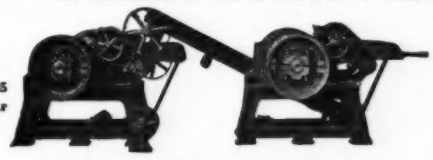

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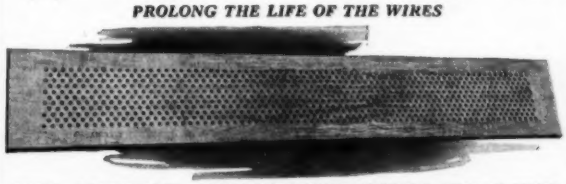

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IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING DECEMBER 26, 1931

SUMMARY

Cigarette paper	1151 cs.
Wall paper	147 bls., 7 cs.
Paper hangings	12 bls., 2 cs.
Painted paper	3 bls.
News print	764 rolls
Printing paper	18 rolls, 13 cs.
Wrapping paper	22 cs.
Filter paper	61 bls., 7 cs.
Drawing paper	5 cs.
Parchment paper	8 cs.
Surface coated paper	8 cs.
Metal coated paper	46 cs.
Decalcomania paper	12 cs.
Tissue paper	68 cs.
Colored paper	5 cs.
Stencil paper	1 cs.
Writing paper	2 cs.
Bowl paper	14 bls.
Ivory board	26 rolls
Card board	20 cs.
Card board boxes	2 cs.
Miscellaneous paper	60 rolls, 105 cs.

CIGARETTE PAPER

Brown & Williamson Tobacco Co., Aquitania, Southampton, 11 cs.

Brown & Williamson Tobacco Co., De Grasse, Havre, 7 cs.

Standard Products Corp., De Grasse, Havre, 25 cs.

Champagne Paper Corp., De Grasse, Havre, 79 cs.

Gluckman & Strauch, De Grasse, Havre, 2 cs.

American Tobacco Co., Indep. Hall, Bordeaux, 300 cs.

De Manduit Paper Corp., Indep. Hall, St. Nazaire, 726 cs.

P. J. Schweitzer, Pres. Garfield, Marseilles, 1 cs.

WALL PAPER

F. J. Emmerich, Britannic, Liverpool, 12 bls.

Bush Service Corp., Volendam, Rotterdam, 1 cs.

A. L. Diament & Co., Aquitania, Southampton, 1 cs.

R. F. Downing & Co., Amer. Merchant, London, 30 bls.

A. C. Dodman Jr. Inc., Amer. Merchant, London, 2 bls.

F. J. Emmerich, Amer. Merchant, London, 2 bls.

Irving Trust Co., Hamburg, Hamburg, 5 cs.

F. J. Emmerich, Hamburg, Hamburg, 99 bls.

Globe Shipping Co., Hamburg, Hamburg, 2 bls.

PAPER HANGINGS

Whiting & Patterson Co. Inc., Aquitania, Southampton, 1 cs.

W. H. S. Lloyd & Co., Amer. Merchant, London, 1 cs., 12 bls.

PAINTED PAPER

F. J. Emmerich, De Grasse, Havre, 3 bls.

NEWS PRINT

Lunham & Reeve, Malaren, Kotka, 370 rolls.

Perkins Goodwin & Co., Hamburg, Hamburg, 394 rolls.

PRINTING PAPER

E. Dietzgen & Co., Volendam, Rotterdam, 12 cs.

H. Reeve Angel & Co., Amer. Merchant, London, 1 cs.

——, Hamburg, Hamburg, 18 rolls.

WRAPPING PAPER

Sylvania Industrial Corp., Lapland, Antwerp, 8 cs.

R. McBratney & Co., Caledonia, Glasgow, 1 cs.

Burroughs Wellcome & Co. Inc., Ascania, Southampton, 1 cs.

Keller Dorian Paper Co., Aquitania, Southampton, 2 cs.

C. Steiner, Hamburg, Hamburg, 10 cs.

FILTER PAPER

A. Giese & Son, Ascania, Bordeaux, 61 bls.

H. Reeve Angel & Co. Inc., Aquitania, Southampton, 3 cs.

H. Reeve Angel & Co. Inc., Amer. Merchant, London, 4 cs.

DRAWING PAPER

Keuffel & Esser Co., Ascania, Southampton, 3 cs.

H. Reeve Angel & Co. Inc., Amer. Merchant, London, 2 cs.

PARCHMENT PAPER

F. C. Strype, Coahoma County, Antwerp, 8 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Lapland, Antwerp, 7 cs.

Globe Shipping Co., Hamburg, Hamburg, 1 cs.

METAL COATED PAPER

K. Pauli Co., Hamburg, Hamburg, 10 cs.

Globe Shipping Co., Hamburg, Hamburg, 36 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Britannic, Liverpool, 4 cs. (simplex).

C. W. Sellers, Bremen, Bremen, 2 cs.

L. A. Consmiller, Bremen, Bremen, 6 cs.

TISSUE PAPER

W. J. Byrnes, Aquitania, Southampton, 3 cs.

Schware Bros. Co., Scythia, Liverpool, 3 cs.

Parsons & Whittemore, Inc., Scythia, Liverpool, 3 cs.

F. C. Strype, Scythia, Liverpool, 1 cs.

P. J. Schweitzer, Pres. Garfield, Marseilles, 58 cs.

COLORED PAPER

F. Murray Hill Co., Hamburg, Hamburg, 5 cs.

STENCIL PAPER

Phoenix Shipping Co., Hamburg, Hamburg, 1 cs.

WRITING PAPER

R. H. Macy & Co., De Grasse, Havre, 2 cs.

BOWL PAPER

Hurley Johnson Corp., Scythia, Liverpool, 14 bls.

IVORY BOARD

R. Wilson Paper Corp., Volendam, Rotterdam, 26 rolls.

CARD BOARD

G. M. Thurnauer, Lapland, Antwerp, 19 cs.

E. Dietzgen & Co., Ascania, Southampton, 1 cs.

CARD BOARD BOXES

Framerican Importing Co., Pres. Garfield, Merseilles, 2 cs.

MISCELLANEOUS PAPER

Defiance Sales Corp., Volendam, Rotterdam, 5 cs.

Downing & Co., Lapland, Antwerp, 2 cs..

American Express Co., Caledonia, Glasgow, 6 cs.

Vernon Bros. & Co., Caledonia, Glasgow, 66 cs.

——, Hamburg, Hamburg, 60 rolls.

Van Oppen & Co., Pres. Garfield, Genoa, 26 cs.

RAGS, BAGGINGS, ETC.

C. Nelson, Caledonia, Glasgow, 42 bls. rags.

J. Cohen Son & Co., Ascania, Southampton, 40 bls. rags.

Banco Coml Italiane Trust Co., Hamburg, Hamburg, 20 bls. rags.

E. J. Keller Co. Inc., Indep. Hall, ——, 63 bls. rags.

E. Butterworth & Co. Inc., Cabo Mayor, Genoa, 65 bls. rags.

GLUE STOCK

Transatlantic Animal By-Products Corp., Coahoma County, Antwerp, 200 bags.

HIDE GLUE

——, Hamburg, Hamburg, 400 bags.

OLD ROPE

Banco Coml Italiane Trust Co., Maria, Trieste, 57 coils.

WOOD PULP

J. Andersen & Co., Argosy, Hernosand, 150 bls. sulphite, 25 tons.

Price & Pierce, Ltd., Argosy, Hernosand, 2700 bls. sulphite, 450 tons.

Bulkley Dunton & Co., Argosy, ——, 3000 bls. wood pulp, 500 tons.

Perkins Goodwin & Co., Argosy, Sundsvall, 2000 bls. sulphate; 650 bls. sulphite.

R. Gair Co., J. E. Newsom, Brodgewater, N. S., 8336 bls. wood pulp, 763 tons; 18 half bales wood pulp.

Castle & Overton, Inc., Volendam, Rotterdam, 460 bls. wood pulp.

E. J. Keller Co. Inc., England Maru, ——, 714 bls. wood pulp, 109 tons.

PHILADELPHIA IMPORTS

WEEK ENDING DECEMBER 26, 1931

Robert Blank, Cabo Mayor, Barcelona, 65 bls. rags.

Katzenstein & Keene Inc., Indep. Hall, Bordeaux, 99 bls. rags.

J. Andersen & Co., Maria, Trieste, 676 bls. wood pulp.

E. J. Keller Co. Inc., Ala, ——, 118 bls. rags.

NEWPORT NEWS IMPORTS

WEEK ENDING DECEMBER 26, 1931

Parsons & Whittemore, Inc., Frankfort, ——, 354 bls. mechanical pulp.

NEW LONDON IMPORTS

WEEK ENDING DECEMBER 26, 1931

Lagerloef Trading Co., Malaren, Wiborg, 3518 bls. sulphate.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 26, 1931

E. M. Sergeant & Co., Argosy, Hernosand, 4800 bls. sulphate, 1750 tons.

J. Andersen & Co., Argosy, Hernosand, 1350 bls. sulphite, 250 tons; 150 bls. sulphate, 25 tons.

Price & Pierce, Ltd., Argosy, Hernosand, 2100 bls. sulphite, 350 tons.

——, Argosy, Hernosand, 900 bls. sulphate, 150 tons.

Perkins Goodwin & Co., Argosy, Sundsvall, 2000 bls. sulphite; 500 bls. sulphate.

Bulkley Dunton & Co., Argosy, ——, 750 bls wood pulp.

——, Argosy, Wiborg, 81 rolls news print

Irving Trust Co., Argosy, Wiborg, 330 bls. sulphate, 55 tons.

Castle & Overton Inc., Argosy, Wiborg, 4555 bls. wood pulp, 900 tons.

Lagerloef Trading Co., Argosy, Helsingfors, 151 rolls wood pulp boards, 26 tons.

Parsons & Whittemore, Inc., Frankfort, ——, 1766 bls. mechanical pulp.

Parsons & Whittemore, Inc., C. of Baltimore, ——, 560 bls. sulphite.

BOSTON IMPORTS

WEEK ENDING DECEMBER 26, 1931

Lagerloef Trading Co., Malaren, Helsingfors, 40 bls. sulphite.

Castle & Overton, Inc., Malaren, Wiborg, 1048 bls. wood pulp.

Lagerloef Trading Co., Malaren, Wiborg, 1320 bls. sulphate; 3120 bls. sulphite.

Lagerloef Trading Co., Malaren, Kotka, 105 bls. mechanical pulp; 2840 bls. sulphate; 102 bls. sulphite.

PORTLAND IMPORTS

WEEK ENDING DECEMBER 26, 1931

Lagerloef Trading Co., Malaren, Helsingfors, 130 bls. sulphate; 1126 bls. sulphite.

Lagerloef Trading Co., Malaren, Wiborg, 1360 bls. sulphate; 3432 bls. sulphite.

Lagerloef Trading Co., Malaren, Kotka, 4065 bls. sulphate; 515 bls. sulphite.

Lagerloef Trading Co., Malaren, Tolkis, 2781 bls. sulphite.

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H. C. Clark & Son Machine Co.

PAPER MILL MACHINERY

LEE, MASS.

Revolving Paper Cutters—Rag Cutters—Cylinder Paper Machines—Washing and Beating Engines—Chilled Iron and Paper Calenders—Fan and Stuff Pumps—Engine Roll Bars and Bed Plates—
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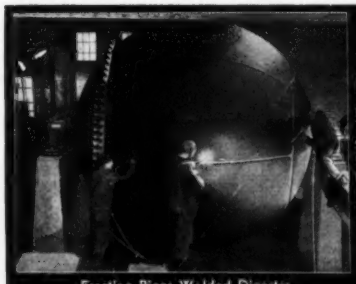

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Heavy Steel and Alloy Plate Work, Welded or Riveted

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BIGGS DIGESTERS
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All types and shades of Oxides of Iron

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EASTON, PA.

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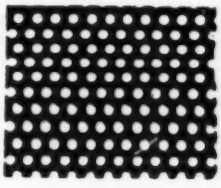
For Pulp and Paper Mills



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Fourdrinier Wires, all widths up to 300 inches

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TOILET PAPER MACHINES
For making Toilet and Paper Towel Rolls
(With or without perforations)

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For Making Wire-Stitched Toilet Tubes

Sanitary Crepe Towel Machines, Roll Tighteners, Slitting and Rewinding Machines, Drop Roll Slitting Machines, Photo Mount Beveling Machines, Rotary Card Cutting Machines, etc.
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DIETZ MACHINE WORKS
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New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, December 30, 1931.

With the Yuletide holidays drawing to a close, increased activity in the local paper market is anticipated in most quarters for the near future. Sales forces of the leading paper organizations are busily formulating plans for a strenuous campaign for orders and are generally optimistic over the outlook. Prices continue irregular.

Production of news print paper slowed down during the Christmas season. However, offerings are quite sufficient to take care of current requirements. Some improvement in the news print market is looked for shortly. One encouraging factor is the report that automobile and department store advertising will expand materially during the next three months, at least.

The paper board market is marking time. Production was curtailed during the Christmas holidays, but the industry is believed to be in a fairly satisfactory statistical position. Demand for the various standard grades of fine paper is light. The kraft paper situation is better despite the fact that prices continue weak.

Mechanical Pulp

Although the ground wood market was quiet during the past week, the industry is considered in a strong position, as production at home and abroad has been keyed to consumption and there are no excess accumulations. Contract shipments of mechanical pulp are going forward in good volume for the time of year. Prices are steady.

Chemical Pulp

The chemical pulp market is only moderately active. Shipments from Sweden and Finland have been heavy doring the past few weeks. This movement is usual at the turn of the year, in anticipation of the closing by ice of navigation on the Baltic. Prices are holding to previously recorded levels, with the exception of bleached soda pulp, which is now offered at $2.50.

Old Rope and Bagging

Paper mill demand for old rope is decidedly restricted. Foreign and domestic old manila rope are arousing little interest, while small mixed rope is moving very slowly. Prices are practically unchanged. No radical changes have been reported in the bagging market. Demand for scrap and gunny is rather light. Prices are easy.

Rags

Quietness reigns in the domestic rag market, some observers express the view that trading will become more buoyant in the near future, when the holidays and the inventory period are left behind. Cotton rags are neglected at present, although roofing grades are moderately active. The imported rag situation remains unchanged, with prices nominal, in most instances.

Waste Paper

The paper stock market continued dull and listless. With the paper board mills closed down during the holidays, there was little interest displayed in the lower grades of waste paper and prices were irregular. No. 1 mixed paper is being offered at from .15 to .20. The better grades of paper stock continue fairly steady and prices are well maintained.

Twine

Steadiness prevails in the local twine market. The volume of sales of the various grades during the last three months of the year was well up to the volume for the corresponding period of the preceding year. Inquiries for future delivery are fairly numerous and the outlook for the future is promising, at least. Prices are generally unchanged.

Boston Paper Trade Optimistic

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 28, 1931—True to form, business the last week or so of the year has been generally rather restricted, buyers naturally wishing to keep their inventories as low as possible. There has been a good volume of inquiry, however, so that wholesalers feel that if a "normal" percentage of this inquiry develops into actual orders, an improvement over conditions which have prevailed in the last three months will result. Some are so optimistic as to feel that there are strong indications of a slight betterment already and that there is bound to be an acceleration in the movement of paper after the turn of the year. In short, the trade is decidedly hopeful.

Ledgers, bonds, writings and book papers have been selling fairly well for the season of the year. From the inquiries received, printers continue to prepare estimates for prospective jobs. Reports of considerable direct-mail advertising work in the coming year are heard. Wrapping paper sales are likewise averaging well.

It is said that box manufacturers believe the low point has been reached in the price of boards. They have been doing much sampling. Many board mills closed December 24 to reopen again January 4, according to their custom of giving a vacation between Christmas and New Year's Day inclusive.

Paper stock dealers are hopeful for more business after the first of the year; in fact, some actually expect improvement. The general price trend, however, is unchanged, several declines having taken place among the grades of old papers, bagging, new and old domestic rags and foreign rags during the last week. The expected cut in No. 1 mixed paper, as rumored a week ago, has developed, so that this grade is now quoted at .18½ @ .20, compared with a former range of .20 @ .22½. As an exception to the position of many grades, foreign gunny has remained firm at 1.15, although 1.00 has been offered. Supplies of paper stock in the hands of consumers is apparently low, because of the urgent request for quick delivery after orders are placed.

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"THE FOURDRINIER THAT TOOK THE IRE OUT OF WIRE"
INTERNATIONAL WIRE WORKS
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KRAFT-WELD
GUMMED SEALING TAPE
"GET THE BEST"
PAPER MANUFACTURERS CO. Inc.
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Your Card in This Space
Will Bring Results

Appleton
Felts and Jackets
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De Laval
Steam Turbine Co., Trenton, N.J.
Steam Turbines, for all speed and steam conditions; capacities up to 15,000 hp. Catalog D45. Helical Gears. Catalog R45. Centrifugal Pumps, for all capacities. Catalog B45. Centrifugal Blowers and Compressors. Catalog F 45. Worm Reduction Gears Catalog R45 Flexible Couplings. Catalog K45. Water Wheels. Catalog T45.

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ASBESTINE FILLER
Reg. U. S. Patent Office 90% Retention

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Woodpulp: Evaluated for quality, strength, bleachability, alpha cellulose, moisture.
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TANKS
of every description by your industry's foremost tank builder. Why not call in a specialist?
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PRACTICAL PAPER MILL CONSULTANT
Specializing in
Automatic Paper-Making Systems
"Direct" White Water Systems
Beater Control Systems
GLYNDON, MARYLAND

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, December 30, 1931.

BLANC FIXE.—The position of the blanc fixe market is practically unchanged. Prices are holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, while the powder is selling at from 3¼ cents to 3⅜ cents per pound, in barrels, at works.

BLEACHING POWDER.—Steadiness prevails in the bleaching powder market. Demand is fairly persistent and the contract movement is well up to average. Prices remain unchanged. Bleaching powder is quoted at from $1.75 to $2 per 100 pounds, in drums, at works.

CASEIN.—The casein market continues quiet. Domestic standard ground is quoted at 7½ cents and finely ground at 8 cents per pound. Argentine standard ground is selling at 8½ cents and finely ground at 9½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Demand for caustic soda is moderately heavy. Prices are holding to schedule. Solid caustic soda is quoted at from $2.50 to $2.55; while the flake and the ground are selling at from $2.90 to $2.95 per 100 pounds, in large drums, at works.

CHINA CLAY.—Following the usual trend at this time of year, the china clay market is quiet. Prices generally remain unchanged. Imported china clay is quoted at from $11 to $13 per ton. Domestic paper making clay is selling at from $7 to $11 per ton, at mine.

CHLORINE.—Satisfactory progress is being made with the signing of contracts for chlorine for the coming year. Prices are holding to formerly quoted levels. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market continues to fluctuate slightly. The grades of gum rosin used in the paper mills are now quoted at from $3.55 to $3.80 per 280 pounds, in barrels, at works. Wood rosin is selling at $3.80 per 280 pounds, in barrels, on dock.

SALT CAKE.—Quietness continues to reign in the salt cake market. Salt cake is still quoted at from $15 to $16; chrome salt cake at from $12 to $13 per ton, in bulk, at works. Imported salt cake is now selling at from $14.50 to $15 per ton, ship side.

SODA ASH.—The soda ash market is steady to firm. Demand for this product is moderately active at present. Prices remain unchanged. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1; in bags, $1.25; and in barrels, $1.38.

STARCH.—Attracted by the lower prices prevailing, the starch market is arousing more interest from the paper mills. The contract movement is normal. Special paper making starch is quoted at $2.62, in bags; and at $2.89, in barrels, per 100 pounds, at works.

SULPHATE OF ALUMINA.—The sulphate of alumina market is exhibiting a strong undertone. Prices remain unaltered. Commercial grades are quoted at from $1.25 to $1.40; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—Dullness prevails in th sulphur market. Sulphur is quoted at $18 per long ton, on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton for any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Most of the business transacted in the talc market is along routine lines. Prices are holding to schedule. Domestic talc is quoted at from $16 to $18 per ton, in bulk, at mine; while imported talc is selling at from $18 to $22 per ton, in bags, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	38.00
Bonds	5.00	@	53.25
Index	6.00	@	12.00
Writings—			
Extra Superfine	14.00	@	32.00
Superfine	14.00	@	32.00
Tub sized	10.00	@	15.00
Engine sized	6.75	@	11.00
Book, Cased—			
S. & S. C.	5.25	@	—
M. F	5.00	@	—
Coated and Enamel	6.25	@	9.75
Lithograph	6.75	@	11.25
Tissues—Per Ream—			
White No. 1	.65	@	.70
Anti-Tarnish M. G. only	.65	@	.70
Colored	.70	@	.90
White No. 2	.55	@	.60
Kraft	.65	@	.70
Manila	.55	@	.60
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	3.37½	@	—
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.00	@	3.00
Card Middies	4.00	@	5.00
Glassine—			
Bleached, basis 25 lbs., No. 1	.09¼	@	—
No. 2	.11¼	@	—
Bleached, basis 20 lbs.	.11¼	@	—

(Delivered New York)

News, per ton—			
Roll, contract	57.00	@	—
Rolls, spot	57.00	@	—
Sheets	62.00	@	—
Side Runs	42.00	@	46.00
Kraft—			
No. 1 Domestic	4.50	@	5.75
No. 2 Domestic	3.00	@	4.25
Southern	2.75	@	4.00
Imported	6.00	@	7.00
Boards—per ton—			
News	24.00	@	27.50
Straw	34.50	@	45.00
Chip	24.00	@	27.50
Binders' Boards	62.00	@	70.00
Standard 85 Test Liner	32.50	@	35.00
Sgl. Mla. Ll. Chip	32.50	@	40.00

(F. o. b. Mill)

Wood Pulp Boards	70.00	@	80.00

Mechanical Pulp

(On Dock)

No. 1 Imported—			
Moist	22.00	@	24.00
Dry	22.00	@	24.00

(F. o. b. Mill)

No. 1 Domestic	25.00	@	30.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—			
Bleached	2.10	@	3.50
Easy Bleaching	1.60	@	1.75
No. 1 strong unbleached	1.50	@	1.75
Mitscherlich unbleached	1.55	@	1.75
No. 2 strong unbleached	1.40	@	1.50
No. 1 Kraft	1.50	@	1.75
No. 2 Kraft	1.40	@	1.50
Sulphate—			
Bleached	2.35	@	2.50

(F. o. b. Pulp Mill)

Sulphite (Domestic)—			
Bleached	2.00	@	4.00
Easy Bleaching	1.75	@	1.90
News	1.50	@	1.65
Mitscherlich	2.40	@	2.55
Kraft (Domestic)	1.60	@	2.75

(Delivered Paper Mills)

Soda Bleached	2.50	@	—

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.00
New White, No. 2	5.50	@	6.00
Silesias No. 1	5.25	@	5.50
New Unbleached	7.00	@	7.50
New Blue Prints	4.00	@	4.50
New Soft Blacks	3.50	@	4.00
Blue Overall	5.00	@	5.25
Fancy	3.00	@	3.50
Washables	2.75	@	3.00
Mixed Khaki Cuttings	3.50	@	4.00
Pink Corset Cuttings	5.00	@	5.50
O. D. Khaki Cuttings	4.50	@	4.75
Men's Corduroy	3.00	@	3.50
New Mixed Blacks	3.00	@	3.25

Old Rags

White, No. 1—			
Repacked	5.25	@	5.75
Miscellaneous	4.25	@	4.75
White, No. 2—			
Repacked	3.00	@	3.50
Miscellaneous	2.30	@	2.50
St. Soiled, White	1.50	@	1.75
Thirds and Blues—			
Repacked	2.25	@	2.50
Miscellaneous	1.65	@	1.85
Black Stockings	3.25	@	3.75
Roofing Rags—			
Cloth Strippings	1.25	@	1.30
No. 1	1.25	@	1.30
No. 2	.90	@	1.00
No. 3	.70	@	.80
No. 4	.65	@	.70
No. 5A	.50	@	.60

Foreign Rags

New Rags

New Dark Cuttings	1.50	@	1.60
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	3.80	@	4.00
Light Flannelettes	4.25	@	4.50
Unbleached Cuttings	6.00	@	6.25
New White Cuttings	4.75	@	5.00
New Light Oxfords	4.00	@	4.25
New Light Prints	2.25	@	2.50

Old Rags

No. 1 White Linens	5.75	@	6.00
No. 2 White Linens	5.00	@	5.25
No. 3 White Linens	3.50	@	4.00
No. 4 White Linens	2.00	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.50
No. 3 White Cotton	2.50	@	3.00
No. 4 White Cotton	1.45	@	1.60
Extra Light Prints	1.90	@	2.10
Ord. Light Prints	1.60	@	1.75
Med. Light Prints	1.40	@	1.55
Dutch Blue Cottons	1.50	@	1.60
French Blue Linens	2.25	@	2.40
German Blue Linens	2.00	@	2.10
German Blue Cottons	1.35	@	1.40
Checks and Blues	1.25	@	1.30
Lindsay Garments	.75	@	.80
Dark Cottons	.70	@	.75
Old Shopperies	.55	@	.60
New Shopperies	.60	@	.65
French Blues	1.40	@	1.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.10	@	1.20
Domestic	1.15	@	1.25
Wool Tares, light	1.05	@	1.10
Wool Tares, heavy	1.10	@	1.15
Bright Bagging	1.05	@	1.10
Small Mixed Rope	.90	@	1.00
Manila Rope—			
Foreign	1.65	@	1.75
Domestic	1.75	@	1.90
New Burlap Cut	1.70	@	1.80
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
Hard, white, No. 1	2.55	@	2.75
Hard, white, No. 2	1.90	@	2.00
White envelope cuttings	2.05	@	2.15
Soft, white, No. 1	1.70	@	1.80
Flat Stock—			
Stitchless	.70	@	.80
Overissue Mag	.70	@	.80
Solid Flat Book	.60	@	.70
Crumped No. 1	.45	@	.50
Solid Book Ledger	1.75	@	1.85
Ledger Stock	.60	@	.70
New B. B. Chips	.20	@	.30
Manilas—			
New Env. Cut	1.75	@	1.85
New Cuttings	1.40	@	1.50
Extra No. 1 old	1.05	@	1.15
Print	.45	@	.50
Bogus Wrapper	.45	@	.50
Container	.25	@	.30
Old Kraft Machine—			
Compressed bales	1.00	@	1.10
News—			
No. 1 White News	1.60	@	1.65
Strictly Overissue	.35	@	.45
Strictly Folded	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Common Paper			Nominal

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AMERICAN MADE
FOR
AMERICAN TRADE

600 TONS DAILY
CAPACITY

H. T. BRAND

COATING CLAY
HIGH GRADE FILLER

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FILLERS

Technical service available for coating and loading without charge. Write for samples.

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FELTS

for every grade of

PULP AND PAPER

We continue to maintain at the top the quality of Excelsior Felts, as we have done since we, as pioneers, made the first endless paper machine felts manufactured in America.

Seamless felts for fast running.
Satin Style felts for finish.
Special felts to meet every condition.
Send us your felt problems.

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75-77 Duane St., N Y., and direct

FAIRBANKS NEW "SPHERO"
VALVE

Continuous operation in paper mills demands quick replacements to all equipment.
SPHERO VALVES are easily repaired without detaching the body from the pipe line.
Lever type in sizes ½-in. to 4-in. Gear type in sizes 4-in., 6-in. and 8-in. For 200 Pounds Steam Working Pressure.

Write for Bulletin V-103

THE FAIRBANKS COMPANY
BOSTON NEW YORK PITTSBURGH
Factory: Binghamton, N. Y. *Distributors Everywhere*

Twines
(F. o. b. Mill)

Cotton—			
B. C., 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Finished Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.13	@	.14
No. 2	.11	@	.12
Tube Rope—			
4-ply and larger	.10¾	@	.11¾
Fine Tube Rope—			
4-ply	.11	@	—
3-ply	.12	@	—
2-ply	.13	@	—
Paper Makers Twine Balls	.07	@	—
Box Twine, 2-3 ply	.07	@	.08
Jute Rope	.09	@	.10
Amer. Hemp, 6	.27	@	.29
Java Sisal—			
No. 1 Basis	.10	@	—
No. 2 Basis	.09	@	—
New Zealand Sisal	.10	@	—
Sisal Lath Yarn—			
No. 1	.12	@	.14
No. 2	.10	@	.12
Manila Twine	.23	@	.28

CHICAGO

Paper
(F. o. b. Mill)

Rag Bond	.30	@	.53¼
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.03¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¼
No. 2 S.&S.C. Book	.05¼	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manilt	.04	@	.04½
No. 1 Kraft	4.50	@	5.00
Southern Kraft	3.00	@	3.25
No. 2 Kraft	3.00	@	3.25
Wood Tag Boards	.04¼	@	.05¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.07	@	.07¼
White Tissue	.07¼	@	.07½
(Delivered Central Territory)			
News, per ton—			
Rolls, contract	57.00	@	—
Sheets	62.00	@	—
Boards, per ton—			
Plain Chip	30.00	@	35.00
Solid News	32.50	@	37.50
Manila Lined Chip	40.00	@	45.00
Container Lined—			
85 Test	50.00	@	55.00
100 Test	55.00	@	60.00

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	1.95	@	2.05
No. 1 Soft White	1.80	@	1.90
Ledger & Writings	.60	@	.70
Solid Books	.60	@	.70
Blanks	1.40	@	1.55
Krafts	1.15	@	1.25
New Kraft Cuts	1.30	@	1.45
Manila Env. Cuts	1.40	@	1.50
Ex. No. 1 Manila	1.25	@	1.30
Print Manila	.40	@	.45
Overissue News	.40	@	.50
Old Newspapers—			
No. 1	.35	@	.45
No. 2	.30	@	.35
Mixed Papers—			
No. 1	.25	@	.30
No. 2	.25	@	.25
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(F. o. b. Mill)

Bonds	.05	@	.40
Ledgers	.07	@	.40
Writings—			
Superfine	.12	@	.18
Extra fine	.16	@	.22
Fine	.15	@	.26
Fine, No. 2	.12	@	.25
Fine, No. 3	.07	@	.20
Book, M. F.	.04¼	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.07	@	.16
Coated Lithograph	.06	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.07	@	.09
Manila Sul., No. 1	.03¼	@	.05½
Manila No. 2	.03	@	.04
No. 1 Kraft	.05¼	@	.06
No. 2 Kraft	.03¾	@	.04¼
Southern Kraft No. 1	—	@	.04
Southern Kraft No. 2	—	@	.03¾
Common Bogus	.03	@	.04
(Delivered Philadelphia)			
News Print Rolls	58.00	@	62.00
Straw Board	50.00	@	—
News Board	30.00	@	32.00
Chip Board	25.00	@	27.50
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	73.00	@	75.00
No. 2, per ton	63.00	@	65.00
Carload lots	62.00	@	67.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.06½
New White, No. 2.	.05	@	.05½
Light Silesias	.05	@	.05½
Silesias, No. 1	.06	@	.08
Black Silesias, soft	.05	@	—
New Unbleached	.06	@	.06½
Washable, No. 1	.02½		.03
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02	@	.02½
New Blue	.02	@	.02½
Fancy	.03	@	.03¼
New Black Soft	.03	@	.03½
New Light Seconds	.01¾	@	.02
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O.D.	.04½	@	.05
No. 2 Mixed	.03½	@	.04
Corduroy	.02½	@	.03
New Canvas	.06½	@	.07
New Black Mixed	.03	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.25	@	2.75
M. G.	4.50	@	—
Thirds and Blues—			
Miscellaneous	1.25	@	1.50
Repacked	1.75	@	2.00
Black Stockings (Export)	3.80	@	4.00
Roofing Stock—			
Foreign No. 1	1.15	@	1.25
Repacked	.80	@	.90

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	2.25	@	2.50
Sisal Rope	1.25	@	1.50
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.50
No. Hard White	2.00	@	2.25
No. 1 Soft White	1.75	@	2.00
No. 2 Soft White	1.40	@	1.50
No. 1 Mixed	.75	@	.80
No. 2 Mixed	.50	@	.55
Solid Ledger Stock	1.35	@	1.40
Writing Paper	.80	@	1.00
No. 1 Books, heavy	.70	@	.75
No. 2 Books, light	Normal		
No. 1 New Manila	1.60	@	1.75
No. 1 Old Manila	1.25	@	1.30
Print Manila	.50	@	.55
Container Manila	.40	@	.45
Old Kraft	1.10	@	1.20
Common Paper	.30	@	.40
No. 1 Mixed Paper	.35	@	.45
Straw Board, Chip	.35	@	.45
Binders Board, Chip	.35	@	.45
Corrugated Board	.45	@	.50
Overissue News	.50	@	.55
Old Newspaper	.30	@	.35

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.05½	@	.11½
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¼
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05½
No. 2 Kraft	—	@	.03
(F. o. b. Boston)			
Southern Kraft	—	@	.03
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¾
(Delivered New England points)			
News Print, rolls	—	@	56.50
Straw Board, rolls	.009	—	@52.50
Straw Board in Sheets, basis 35s to 70s	—	@	50.00
Filled News Board	27.50	@	30.00
Chip Board	—	@	25.00
Chip Board (Creasing)	27.50	@	30.00
Single Manila Lined Chip	—	@	35.00
Single White, Patent Coated News Board—			
Binder	52.50	@	60.00
Wood Pulp Board	70.00	@	75.00
Binder Boards	67.50	@	75.00

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.50
No. 2 Hard White	2.25	@	2.50
No. 1 Soft White	1.75	@	2.00
No. 2 Mixed	.50	@	.55
No. 1 Mixed	.75	@	.85
Solid Ledger Books	1.75	@	2.00
Overissue Ledger Stock	1.35	@	1.60
Mixed Ledgers	1.15	@	1.30
No. 1 Books, heavy	.65	@	.75
No. 1 Books, light	—	@	.45
Crumpled Stitchless Book Stock	1.00	@	1.25
Manila Env. Cuttings	1.85	@	2.00
No. 1 Old Manila	—	@	1.00
White Blank News	1.40	@	1.50
Kraft No. 1	.85	@	1.05
Manila	.90	@	1.00
No. 1 Mixed Paper	.18½	@	.20
Print Manila	.40	@	.45
Overissue News	.35	@	.45
Old Newspapers	.27½	@	.32½
Box Board, Chip	.20	@	.25
Corrugated Boxes	.32½	@	.37½

Bagging
(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.15
Domestic	1.40	@	1.50
Manila Rope—			
Foreign	1.50	@	1.75
Domestic	1.75	@	2.00
Transmission Rope	1.25	@	1.40
Mixed String	.25	@	.35
Jute Rope	1.00	@	1.15
Jute Carpet Threads	.75	@	.90
Bleachery Burlap	2.50	@	2.75
No. 1 Scrap Burlap	1.00	@	1.10
Scrap Sisal	1.15	@	1.25
Scrap Sisal for shredding	1.30	@	1.40
Wool Tares, heavy	1.25	@	1.30
New Burlap Cutting	1.50	@	1.75
Australian Pouches	2.00	@	2.25
Heavy Baling Bagging	1.50	@	1.60
Paper Mill Bagging	.90	@	1.05
Bagging No. 2	.50	@	—
No. 1 Burlap	—	@	3.50

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1.	.05½	@	.06
New White No. 2.	.04½	@	.05
Silesias No. 1	.04½	@	.05
New Black Silesias	.02½	@	.02¾
New Unbleached	.04½	@	.05
Fancy	.04	@	.04½
Washable	.04	@	.04½
Cottons—According to grades—			
Blue Overalls	.05	@	.06
New Black, soft	.04	@	.04¼
Khaki Cuttings	.03	@	.03½
O. D. Khaki	.04½	@	.05
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	—	@	4.00
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.00	@	2.25
Thirds and Blues—			
Repacked	1.60	@	1.80
Miscellaneous	1.00	@	1.20
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	.48	@	.53
No. 2	.43	@	.48
No. 3	.38	@	.43

Foreign Rags

Dark Cottons	.55	@	.60
(F. o. b. Boston)			
New No. 1 White Shirt Cuttings	5.00	@	5.50
Dutch Blues	—	@	1.80
New Checks & Blues	4.00	@	4.50
Old Fustians	1.55	@	1.65
Old Linsey Garments	.65	@	.70

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.11¾	@	—
No. 2 Colored	.09	@	.10½
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (Carloads)	6.65	@	—
No. 3 M. F. (Carloads)	6.20	@	—
No. 1 S. C. (carloads)	7.15	@	—
No. 3 S. C. (carloads)	6.65	@	—
No. 4 S. C. (carloads)	5.70	@	—
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.50	@	—
No. 3 Coated and Litho	10.00	@	11.50
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.60	@	—
White Wrap	5.10	@	—
"B" Manila	5.00	@	—
No. 1 Manila	5.60	@	—
Fiber	5.60	@	—
Kraft, M. F.	5.98	@	—
Kraft No. 2	5.60	@	—
News, per ton—			
Rolls (contract)	56.50	@	57.00
Sheets	61.50	@	—

Pulp
(F. o. b. Mill)

Ground Wood	30.00	@	32.00
Sulphite easy bleaching	50.00	@	—
Sulphite, news grade	44.00	@	—
Sulphite, bleached	62.50	@	75.00
Sulphate	60.00	@	—

Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.85	@	—
Soft White	2.40	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	—
Light and Crumpled Book Stock	.80	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut	1.70	@	—
Printed Manilas	.65	@	—
Kraft	1.75	@	—
News and Scrap—			
Strictly Overissue	.50	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags
(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09½	@	.10
Fancy Shirt Cuttings	.06	@	.06¼

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PAPER TRADE JOURNAL

Vol. XCIII DECEMBER 31, 1931 No. 27

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that pull work-a-day loads

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have the uphill horsepower to carry excessive overloads. Test them first on your hardest drives.

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RHOADS TANNATE BELTING

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The Beloit modernizing plan embraces the following nine features, which virtually transform your old machine into a modern, high-speed, smooth-operating, economical, money-making 1932 production unit:

1. Universal Super Shake
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4. Silent Chain Drive
5. Oil-less, self-balancing Steam Joints
6. Automatic Unloading Winder
7. Improved Semi-Automatic Reel
8. Suction Box Oscillator
9. Beloit Wire Carriage

Write us for details on the application of any one or more of these modern features to your individual needs.

The *Beloit* Way is the *Modern* Way

BELOIT IRON WORKS, BELOIT, WIS., U. S. A.

The BELOIT

BELOIT IRON WORKS PAPER MACHY BELOIT WIS

Entered as second class matter March 3, 1925, at the Postoffice at East Stroudsburg, Pa., under the Act of Congress of March 3, 1879. Published every Thursday by the Lockwood Trade Journal Co. at 34 N. Crystal St., East Stroudsburg, Pa. Executive and Editorial Offices: 10 E. 39th St., New York, N. Y.

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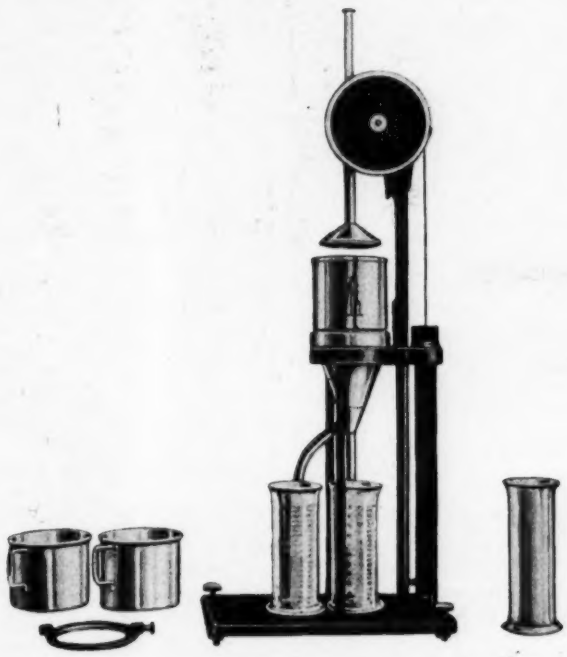

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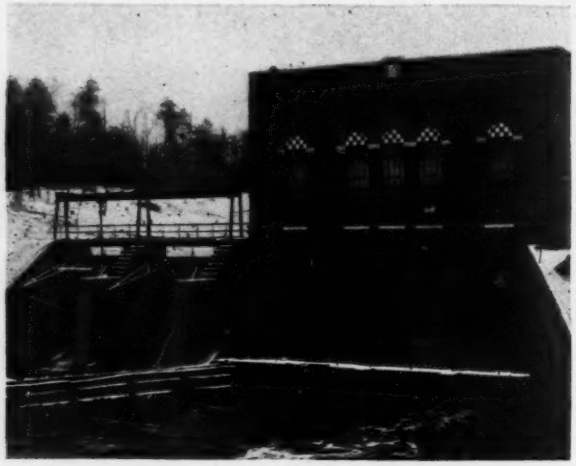

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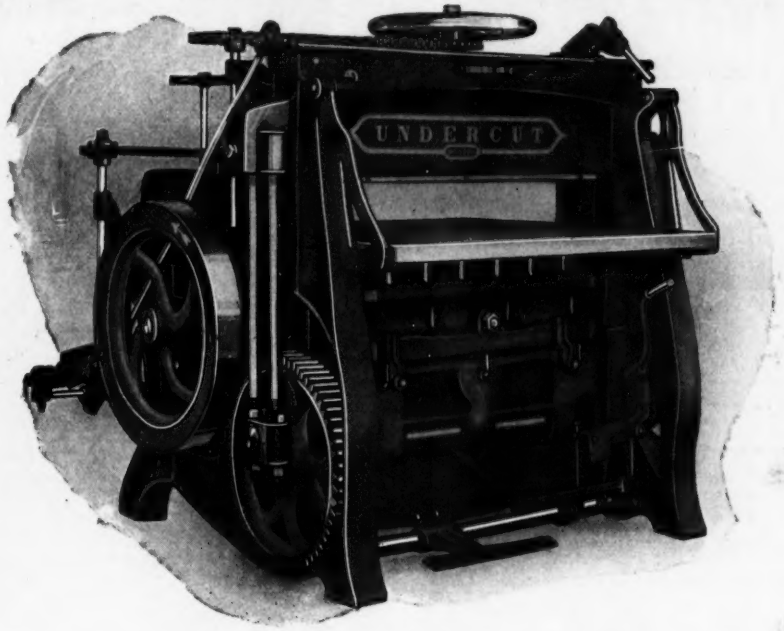

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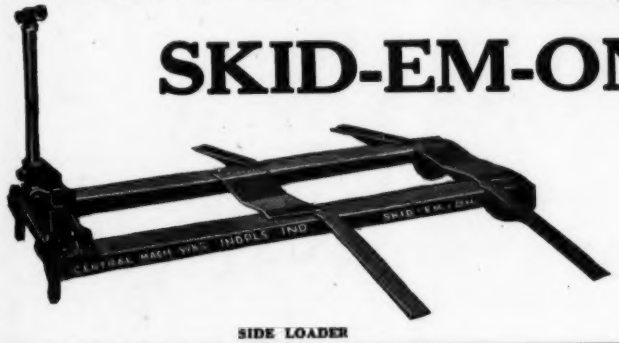

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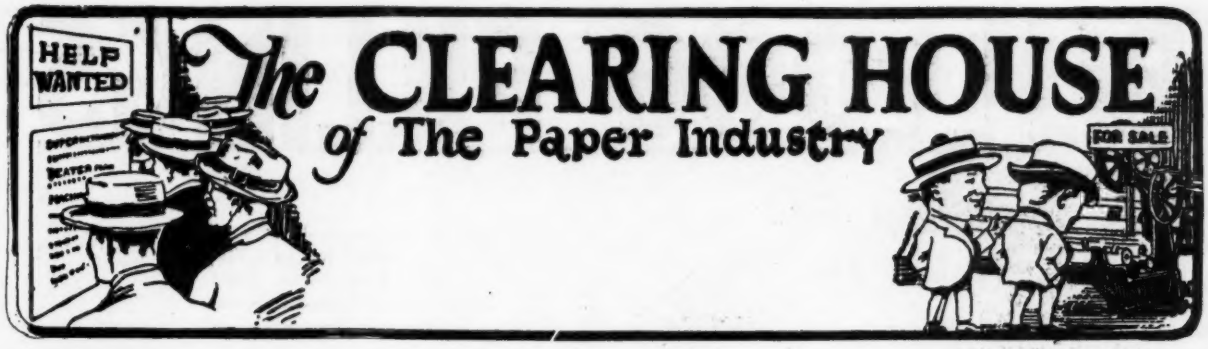

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WANTED—Beater man familiar with colors on wood tissues. Address Box 31-543, care Paper Trade Journal. J-7

WANTED—Competent, alert, sober machine tender for 110" Fourdrinier machine in Eastern New York State Mill. Two Shifts. Good living and educational conditions and good position for a thoroughly good man. State age and experience. Address Box 31-547, care Paper Trade Journal. D-31

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PAPER MILL SUPERINTENDENT for making bond, mimeograph, offset, ledger and sulphite specialties—state age, also experience in detail. Address Box 31-546, care Paper Trade Journal. J-14

WANTED by waxed paper manufacturer, an experienced salesman for Detroit and vicinity, commission basis. Address Box 31-539 care Paper Trade Journal. D-31

MACHINE tender wanted in board mill, making test liner, Chip board and folding box board. Work three shifts. Give age and reference in first letter. Address Box 31-541, care Paper Trade Journal. J-7

SITUATIONS WANTED

POSITION WANTED—Superintendent or foreman experienced with chip board building, felt and asbestos. Good at construction repairs and remodeling. Address Box 31-540, care Paper Trade Journal. D-31

SUPERINTENDENT of long years experience on loft or air dried papers and book papers is in the market for a position. Can furnish best of references. Would accept night boss. Address, Box 31-520, care Paper Trade Journal. J-21

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SITUATION WANTED by first class superintendent, day or night, or boss beaterman. Well up on Kraft, twisting, wax and all grades of tissues and colors. A-1 references. Address, Box 31-407, care Paper Trade Journal. D-31

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J-7

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CUT-OFF SAWS
Murray, D. J. Mfg. Co.
CUTTING (Grinding and Stamping Compounds)
Oakite Products, Inc.
CYLINDER COVERS
Green Bay Wire Works
Wisconsin Wire Works
CYLINDER, RAILROAD AND DEVIL DUSTER
Moore & White Co., The
CYLINDER DRIVES
Moore & White Co., The
CYLINDER MOULDS
Glens Falls Machine Co.
Shartle Bros. Mach. Co.
CYLINDER VALVES
Green Bay Foundry & Mach. Works
CYLINDER WIRES
Appleton Wire Works
International Wire Works
DAMPENERS
Norwood Engineering Co.
Perkins & Sons, Inc., B. F.
DANDY ROLLS
Wisconsin Wire Works
DECKERS
Bird Machine Company
Glens Falls Machine Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.
Valley Iron Works
DENSITY REGULATOR
Merritt Engineering & Sales Corp., The
DIE CUTTERS
Appleton Machine Co., The
Biggs Boiler Works
DIFFUSERS
Biggs Boiler Works
Manitowoc Eng. Works
DIGESTER FITTINGS
Duriron Company Inc., The
Stebbins Engineering & Mfg. Co.
DIGESTER LININGS
Stebbins Engineering & Mfg. Co.
DIGESTERS (Experimental)
Alloy Steel Products Co.
DIGESTERS (Sulphate and Sulphite)
Biggs Boiler Works
Downingtown Iron Works, The
Manitowoc Eng. Co.
Smith Corp. A. O.
DISC BARKERS
Waterville Iron Works
DISPENSERS
Griffith-Hope Co.
DOCTORS
Bird Machine Co.
DOCTOR BLADES
Bird Machine Company
DOORS (Retort)
Biggs Boiler Works Co.
DREDGE PIPE
Biggs Boiler Works Co.
Naylor Spiral Pipe Co.
DRIVES (Paper Machinery)
Allis-Chalmers Mfg. Co.
Bird Machine Co., (Pulmax Drive Div.)
Farrel-Birmingham, Co.
Link-Belt Co., The
Philadelphia Gear Works
Shartle Bros. Machine Co
DRIVES (SHORT CENTER)
Bird Machine Co., (Pulmax Drive Div.)
Link-Belt Co., The
DRIVES (Spiral)
Link Belt Co.
Philadelphia Gear Works
DRIVER DRAINAGE SYSTEMS
Mid West-Fulton Machine Co.
DRYER BEARINGS
Bantam Ball Bearing Co., The
DRYER EXHAUSTS
Nash Engineering Co., The
DRYER DOCTORS
Bird Machine Company
DRYER JOINTS
Shartle Bros. Machine Co.
DRYERS
Biggs Boiler Works Co.
Horne & Sons Co., J. H.
Manitowoc Eng. Works
Shartle Bros. Machine Co.
DRYING SYSTEMS
Mid West-Fulton Machine Co., The
Pickles, W. F.
Ross Engineering Co., J. O.
Stickle Steam Specialties Co.
Waldron Corporation, The
DUST COLLECTOR PIPE
Naylor Pipe Co.
DUSTING MACHINERY
Jones & Sons Co., E. D.
Norwood Engineering Co.
DYES, (ANILINE)
General Dyestuff Corp.
Heller & Merz
National Aniline & Chem. Co.
Geigy Colour Co., The
ELECTRIC EQUIPMENT
Allis Chalmers Mfg. Co.
Cutler-Hammer Mfg. Co.
General Electric Co.
ELEVATORS
Caldwell & Son Co., H. H.
EMBOSSING CALENDERS
Norwood Engineering Co.
Perkins & Sons, Inc., B. F.
Textile Finishing Machinery
EMBOSSING MACHINES
Paper Converting Machine Co., Inc.
John Waldron Corp.
EMBOSSING MACHINE (Napkin)
Paper Converting Machine Co.
John Waldron Corp.
ENGINEERS
E. R. Barker
Dorr Company
Layne & Bowler, Inc.
Little, Inc., Arthur D.
ENGINES (STEAM)
Allis Chalmers Mfg. Co.
Murray Iron Works
ENVELOPE MACHINES
Potdevin Machine Co.
ESTIMATES
Chemi-pulp Process Inc.
EVAPORATORS
Murray, D. J. Mfg. Co.
EXTRACTORS
Dayton Beater & Hoist Co.
Mid-West Fulton Machine Co.
Valley Iron Works Co.
FANS
Ross Engineering Corp., J. O.
FAN PUMPS
Lawrence Mach. and Pump Co.
Moore & White Co.
Valley Iron Works Co.
FANS (Ventilating)
Perkins & Son, Inc., B. F.
Ross Engineering Corp., J. O.
FEED WATER HEATER
Stickles Steam Specialties Co.
FELT CARRIER ROLLS
American Wringer Co.
FELTS AND JACKETS
Albany Felt Co.
Appleton Woolen Mills
Bulkley, Dunton & Co.
Draper Bros. Co.
Fitchburg Duck Mills
Huyck & Son, E. C.
Lockport Felt Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Turner, Halsey Co.
Waterbury Felt Co.
FILLERS
United States Gypsum Co.
FILTERS
Filtration Engineers, Inc.
Glens Falls Machine Works
Inversand Company
Moore & White Co.
J. O. Ross Engrg. Corp.
Oliver United Filters, Inc.
FILTERS (Gravity & Pressure)
Permutit Company
FILTERS (Gravity Type)
Magnuson Products Corp.
FILTER WIRES
Appleton Wire Works
Oliver United Filters Inc.
FILTERING SYSTEMS
Hungerford & Terry, Inc., The
Norwood Engineering Co.
Oliver United Filters Inc.
FITTINGS (Chrome Nickel)
Alloy Steel Products Co.
FIXTURES (Towel, Toilet, Napkin)
Griffith Hope Co.
FLAT SCREENS
Bird Machine Company
Glen Falls Machine Co.
FLEXIBLE COUPLINGS
Allis Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Jones Foundry & Machine Co., W. A.
Link Belt Co.
John Waldron Corp.
FLOOR PLATES
American Pressed Steel Co.
FLOOR TILE (Non-Slip)
Norton Co.
FLOORS (Engine & Machine Room)
Magnuson Products Corp.
FLOW METER
General Electric Co.
FLY BARS
Dayton Beater & Hoist Co.
Jones & Sons Co., E. D.
Mid-West Fulton Machine Co.
FOLDING MACHINES (Single Type)
Norwood Engineering Co.
FOLDING MACHINES
Paper Converting Machine Co., Inc.
Waldron, John, Corp.
FOLDING TESTERS
Testing Machines Inc.
FOURDRINIER BEARINGS
Bantam Ball Bearing Co., The
FOURDRINIER WIRES
Appleton Wire Works
Eastwood Corporation
Green Bay Wire Works
International Wire Works
Neumeyer & Dimond
Wisconsin Wire Works
FOURDRINIER WIRES (Rolled)
Wisconsin Wire Works
FOURDRINIER WIRE CLEANING
Oakite Products, Inc.
FREENESS TESTERS
Testing Machines, Inc.
FRICTION CALENDERS
Norwood Engineering Co.
Perkins & Son, Inc., B. F.
FRICTION CLUTCHES
Allis Chalmers Mfg. Co.
Link-Belt Co., The
Moore & White Co.
GEARS
De Laval Steam Turbine Co.
Link-Belt Co., The
Philadelphia Gear Works
GEARS (Machine Cut)
De Laval Steam Turbine Co.
Limited, Charles
Link-Belt Co., The
Philadelphia Gear Works
GEARS AND PINIONS
Link-Belt Co., The
Moore & White Co.
Philadelphia Gear Works
GENERATORS
Allis Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Co.
GRANITE PLATES
Green Bay Foundry & Mach. Works
GRANITE ROLLS
Perkins & Son, Inc., B. F.
GREASES
Vacuum Oil Co.
GRATING (SIDEWALK)
Hendrick Mfg. Co.
GREY IRON CASTINGS
Ryther & Pringle Co.
GRID UNIT
Murray Mfg. Co., D. J.
Unit Heater & Cooler Co. The
GRINDER VALVES
Glens Falls Machine Works
GRINDING WHEELS
Norton Co.
GROUND WOOD
Borregaard Co., Inc.
GUIDES (Automatic Web)
John Waldron Corp.
GUIDES (FELT)
Moore & White Co.
Shartle Bros. Machine Co.
GUMMED TAPE TESTERS
Thwing Instrument Co.
GUMMING AND GLUING MACHINERY
Potdevin Machine Co.
Shartle Bros. Machine Co.
Waldron Corporation, John
GUMMED SEALING TAPE
Paper Manufacturers Co.
HANGERS
Link-Belt Co., The
HAND TRUCKS
Fairbanks Co.
HEAD BOXES
Magnuson Products Corp.
HEATERS (Unit)
J. O. Ross Engrg. Corp.
HEATING AND VENTILATING SYSTEMS
Ross Engineering Corp., J. O.
Stickles Steam Specialties Co.
HIGH DENSITY THICKENERS
Oliver United Filters, Inc.
Moore & White Co.
HOISTS (Electrical)
Allis Chalmers Mfg. Co.
HOIST (Headgate)
Dayton Beater & Hoist Co.
HOISTS (ELECTRIC)
General Electric Co.
HYDRAULIC MACHINERY
Farrel-Birmingham, Co.
HYDRO-ELECTRIC DEVELOPMENTS
Johnson & Wierk, Inc.
Smith S. Morgan

HYDRAULIC TURBINES
Allis Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Smith S. Morgan

HYDROGEN-ION APPARATUS
Cambridge Instrument Co.

HYGROMETERS, PAPER STOCK
Cambridge Instrument Co.

HYGROMETER
Testing Machines, Inc.

INCINERATORS
Manitowoc Eng. Works

INDICATORS
Taylor Instrument Co.

INSPECTIONS
United States Testing Co.

INTERFOLDING MACHINES
Paper Converting Machine Co., Inc.

JORDAN ENGINES
Appleton Machine Co.
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Shartle Bros. Machine Co.
Valley Iron Works

JORDAN FILLINGS
Bahr Bros. Mfg. Co., The
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Shartle Bros. Machine Co.
Valley Iron Works

KETTLES (Steam Jacketed)
Biggs Boiler Works Co.

KNIVES, ETC.
Dilts Machine Works, Inc.
Simonds-Worden-White Co.
Shartle Bros. Machine Co.
Taylor Stiles & Co.

KNOT SAWING MACHINES
DeZurik Shower Co., The

KNOTTERS
Fibre Making Process, Inc.
Glens Falls Machine Co.

KRAFT PAPER
Jones, W. C., Inc.

LABORATORY EQUIPMENT
Testing Machines, Inc.
Thwing Instrument Co.
Valley Iron Works

LAY BOYS
Moore & White Co.

LIME MUD FILTERS
Oliver United Filters Inc.

LIQUID CHLORINE
Electro Bleaching Gas Co.
Kalbfleisch Corp.
Mathieson Alkali Works, Inc.

LOG HAULS
Ryther & Pringle Co.

LOFT DRYERS
Ross Engineering Corp., J. O.
John Waldron Corp.

LUBRICANTS
Cities Service Company
Vacuum Oil Co.

MECHANICAL STOKERS
Babcock & Wilcox Co.

METALLIC PACKING JOINTS
Reliable Machine Co.

METHODS, (Cleaning)
Oakite Products, Inc.

MIMEOGRAPH PAPER
Jones, W. L., Inc.

MOTORS
Allis Chalmers Mfg. Co.
General Electric Co.

NAPKIN FOLDING MACHINE
Paper Converting Machine Co., Inc.
Waldron, John, Corp.

NAPKIN DISPENSERS
Griffith-Hope Co.

NON-CORROSIVE METALS
Duriron Company Inc., The

OILS
Cities Service Company

OILS AND GREASE
Vacuum Oil Co.

OPERATING SURVEYS
Chemical Process Inc.

PACKING
Green Tweed & Co.

PAPER BAG BUNDLING MACHINERY
Potdevin Machine Co., The

PAPER BAG MACHINERY
Heinrich Inc., H. H.
Potdevin Machine Co.
Smith & Winchester Mfg. Co.

PAPER BAG MACHINERY (ALL TYPES)
Potdevin Machine Co., The

PAPER BREAK RECORDERS
Thwing Instrument Co.

PAPER CUTTERS
Hamlet Machine Company
Inman Manufacturing Co.
Moore & White Co.
Shartle Bros. Machine Co.
Smith & Winchester Mfg. Co.

PAPER CALENDER ROLLS
Perkins & Son, Inc., B. F.

PAPER CORES
Climax Tube Co.

PAPER DAMPENERS
Perkins & Son, Inc., B. F.

PAPER GUILLOTINE
Heinrich, Inc., H. H.

PAPER DUSTERS
Moore & White Co.

PAPER DYES
National Aniline & Chemical Co., Inc.

PAPER MANUFACTURERS
Brown Company
Kalamazoo Vegetable Parchment Co..
Oxford Paper Co.
West Virginia Pulp & Paper Co.

PAPER MACHINE HOODS
Ross Engineering Corp., J. O.
Stickles Steam Specialties Co.

PAPER MILL SUPPLIES
Castle & Overton, Inc.

PAPER AND BOARD CUTTERS
Horne & Sons Co., J. H.

PAPER AND PULP MACHINERY
Appleton Machine Co.
Baker Manufacturing Corp.
Beloit Iron Works
Biggs Boiler Works, The
Bird Machine Co.
Black-Clawson Co.
Davis, Frank H.
Clark-Aiken Co.
Dayton Beater & Hoist Co.
Dominion Engineering Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Glens Falls Machine Co.
Green Bay Foundry & Mch. Works
Horne & Sons Co. Inc. J. H.
Lobdell Car Wheel Co.
Mid-West Fulton Machine Co.
Moore & White Co.
Paper Machy. Ltd.
Paper & Textile Machinery Co.
Perkins & Son, Inc., B. F.
Pusey and Jones Corp.
Rice Barton-Falen, Inc.
Ryther & Pringle Co.
Shartle Bros. Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

PAPER AND PULP MILL BROKERS
Gibbs-Brower Co.

PAPER ROLL PLUGS
Wood Products Co.

PAPER SCALES
Testing Machines, Inc.
Thwing Instrument Co.

PAPER STOCK DEALERS
Castle & Overton, Inc.

PAPER STOCK WASHERS
Dayton Beater & Hoist Co.
Jones & Sons Co., E. D.

PAPER SCREENS
Bird Machine Company
Shartle Bros. Machine Co.

PAPER TESTERS
Perkins & Son, Inc., B. F.
Testing Machines, Inc.
Thwing Instrument Co.
Valley Iron Works Co.

PAPER TRIMMING KNIVES
Simonds-Worden-White Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Potdevin Machine Co., The

PAPER WAXING MACHINERY
Gibbs-Brower Co.
Potdevin Machine Co.
Waldron Corporation, John

PENESCOPE PENETRATION TESTER
Thwing Instrument Co.

PENSTOCKS
Biggs Boiler Wks.

PERFORATING MACHINES
Dietz Machine Works
Waldron, John, Corp.

PERFORATED DRAINERS
Nortmann-Duffke Co.

PERFORATED METAL
Allis Chalmers Mfg. Co.
Harrington & King Perforating Co.
Mundt & Sons, Charles
Nortmann-Duffke Co.

PINE OIL
Hercules Powder Co.

PIPE (Chrome Nickel)
Alloy Steel Products Co.

PIPE WATER SUPPLY (Steel and Iron)
Biggs Boiler Works Co.

PIPE (Spiralweld)
Naylor Pipe Co.

PIPE (Steel)
Biggs Boiler Works Co.
Naylor Pipe Co.

PIPE (Toncan Iron)
Naylor Pipe Co.

PIPE FITTINGS
Naylor Pipe Co.
Walworth Company

PIPING
Naylor Pipe Co.

PITCH NEUTRALIZERS
Oakite Products, Inc.

PLATING, CHROMIUM
Chromium Corp. of America
Norwood Engineering Co.

PLATERS
Perkins & Son, Inc., B. F.

PLAYING CARD MACHINERY
Waldron, John, Corp.

PLUGS
Wood Products Co., Inc.

POWER TRANSMISSION EQUIPMENT
De Laval Steam Turbine Co.
Hunt Machine Co., Rodney
Link Belt Co.

PRECISION INSTRUMENTS
Testing Machines, Inc.
Thwing Instrument Co.

PRESSES (Napkin)
Paper Converting Machine Co.

PRESS ROLLS
American Wringer Co., Inc.
Appleton Machine Co., The
Baker Manufacturing Corp.
Goodrich Rubber Co.
Horne & Sons Co., J. H.
Paper Mchy. Ltd.
Shartle Bros. Machine Co.
Valley Iron Works Co.

PRESS ROLL DOCTORS
Bird Machine Company

PRESS ROLLS (Granite)
Perkins & Sons, Inc., B. F.

PRESSURE CONTROL SYSTEMS
Link Belt Co., The
Mid-West Fulton Machine Co.
Stickles Steam Specialties Co.

PRESSURE REGULATORS
Davis Regulator Co.

PRINTING MACHINES
Heinrich, Inc., H. H.
Waldron, John, Corp.

PRINTING PRESSES
Paper Converting Machine Co., Inc.

PULLEYS
Link-Belt Co., The

PULLEYS (Semi-Steel)
Link Belt Co.

PULP AND PAPER MACHINERY
Horne & Sons, Co., J. H.

PULP & PAPER MILL MACHINERY
Paper & Textile Mach. Co.
Pusey and Jones Corp.

PULPERS
Noble & Wood

PULPSTONES
Norton Co.

PULP DECKERS
Bird Machine Company
Filtration Engineers, Inc.

PULP GRINDERS
Glens Falls Machine Works
Green Bay Barker Machine & Tool Works
Montague Machine Co.

PULPS (KRAFT)
Borregaard Co., Inc., The
Lagerloef Trading Co., Inc.

PULP PRESSES
Farrel-Birmingham, Co.

PULP REFINER
Baker Corp., The

PULP SCREENS
Bird Machine Company
Trimbey Machine Works

PULPS (SULPHITE)
Lagerloef Trading Co., Inc.

PULPS (MECHANICAL)
Lagerloef Trading Co., Inc.

PULP TESTING
Little, Arthur D.
U. S. Testing Co.

PULP THICKENERS
Bird Machine Company
Filtration Engineers, Inc.
Glens Falls Machine Co.
Moore & White Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.

PULP WASHERS
Bird Machine Company
Filtration Engineers, Inc.
Glens Falls Machine Works
Oliver Continuous Filter Co.
Pulp Bleaching Corp.

PULP WOOD CHIPPERS
Waterville Iron Works

PUMP PRIMERS (Steam and Water Jet)
Appleton Machine Co., The
Lawrence Mach. and Pump Co.
Noble & Wood Machine Co.
Shartle Bros. Machine Co.
Valley Iron Works Co
Warren Steam Pump Co.

PUMPS (Acid)
De Laval Steam Turbine Co.
Frederick Iron & Steel Co.

PUMPS (Acid Centrifugal)
De Laval Steam Turbine Co.
Frederick Iron & Steel Co.
Lawrence Mach. & Pump Co.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Oliver United Filters Co.
Shartle Bros. Machine Co.
Valley Iron Works
Warren Steam Pump Co.

PUMPS (Centrifugal)
Layne & Bowler Inc.
Moore & White Co.

PUMPS (Deep Well)
Layne & Bowler Inc.

PUMPS (Rotary Cycloidal)
Lawrence Mach. and Pump Co

PUMPS (Stuff)
De Laval Steam Turbine Co.
Lawrence Mach. & Pump Co.
Frederick Iron & Steel Co.
Moore & White Co.
Nash Engineering Co.
Shartle Bros. Machine Co.
Valley Iron Works Co.
Warren Steam Pump Co.

PUMPS (Stock)
Frederick Iron & Steel Co.
Shartle Bros. Machine Co.
Warren Steam Pump Co.

PUMPS (Suction)
Mid-West Fulton Machine Co.
Moore & White Co.
Nash Engineering Co.

PUMPS (Vacuum)
Lawrence Mach. & Pump Co.
Nash Engineering Co., The
Warren Steam Pump Co.

PYROMETERS (Roll)
Cambridge Instrument Co.
Thwing Instrument Co.

RADIAL BEARINGS
Bantam Ball Bearing Co., The

RAG CUTTERS
Clark-Aiken Co.
Perkins & Son, Inc., B. F.
Taylor Stiles & Co.

RECORDING INSTRUMENTS
Brown Instrument Co.
Cambridge Instrument Co.
Taylor Instrument Co.
Thwing Instrument Co.

RECORDING TACHOMETERS
General Electric Co.

RECOVERY SYSTEMS (Waste Heat)
J. O. Ross Engrg. Corp.

RECOVERY SYSTEMS (Soda & Sulphite)
Ross Engineering Corp., J. O.

REDUCTION GEARS
Farrel-Birmingham Co., Inc.
Link-Belt Co., The
Mid-West Fulton Machine Co.

REELS (Upright & Revolving)
De Laval Steam Turbine Co.
Hunt Machine Co., Rodney
Moore & White Co.

REFINERS (Centrifugal)
Bahr Bros.
Bird Machine Co.
Manitowoc Eng. Works
Tolhurst Machine Co.

REFINING ENGINES
Jones & Son Co., E. D.
Shartle Bros. Machine Co.

REFRACTORIES
Norton Co.

REGULATORS
Trimbey Machine Works

REMOVERS (Paint & Finish)
Oakite Products, Inc.

REWINDERS
Cameron Machine Co.
Inman Manufacturing Co.
Moore & White Co.
John Waldron Corp.

ROD MILL
Allis Chalmers Mfg. Co.
Green Bay Foundry & Mach. Works
Mine & Smelter Co.
Shartle Bros. Machine Co.

ROLL GRINDERS
Dayton Beater & Hoist Co
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.

ROLL SLITTING MACHINES
Cameron Machine Co.
Goebel, A. C.

ROLL STANDS
Cameron Machine Co.
Moore & White Co.

ROLL WINDING MACHINES
Cameron Machine Co.

ROLLED STEEL FLANGES
Navior Spiral Pipe Co.

ROLLS (Chilled Iron & Gray Iron)
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
Shartle Bros. Machine Co.
Valley Iron Works

ROLLS (Embossing)
Perkins & Son, Inc., B. F.
John Waldron Corp.

ROLLS (Calender)
Perkins & Son, Inc., B. F.
John Waldron Corp.

ROLLS (Paper)
John Waldron Corp.
Goodrich Rubber Co.
Horne & Sons Co., J. H.

ROLLS (Rubber or Rubber Covered)
American Wringer Co.

ROSIN
Hercules Powder Co.

ROSIN SIZE
American Delthirna Corp.
General Naval Stores Co., Inc.
Hercules Powder Co.
Kalbfleisch Corp., The
Paper Makers Chemical Co.

ROTARY BLEACHING BOILERS
Biggs Boiler Works Co.
Manitowoc Eng. Works

ROTARY PULP SCREENS
Bird Machine Company
Montague Machine Co.

ROTARY PRINTING PRESSES
Potdevin Machine Co., The

ROTARY SCREENS
Bird Machine Co.
Moore & White Co.
Valley Iron Works

ROUND TANKS
Kalamazoo Tank & Silo Co.
Stearns Lumber Co., A. T.

RUBBER BELTING
Dayton Rubber Mfg. Co.

RUBBER COVERED ROLLS
American Wringer Co.

RUST PREVENTATIVES
Oakite Products, Inc.

SAND & POLISHING MACHINES
Waldron, John, Corp.
Hooker Electrochemical Co.
Pennsylvania Salt Co.

SATURATING MACHINES
Gibbs-Brower Co.
Moore & White Co.
Shartle Bros. Machine Co.
Waldron, John, Corp.

SAVE ALL WIRES
Baker Manufacturing Corp.
Green Bay Wire Works

SAVEALLS
Bird Machine Co.
De Laval Steam Turbine Co.
Filtration Engineers, Inc.
Glens Falls Machine Works
Green Bay Foundry & Mach. Co.
Moore & White Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.

SAW SHARPENERS
Covel-Hanchett Co.

SCALES
Richardson Scale Co.

SCALES (Automatic Dial)
Kalbfleisch Corporation, The

SCORE TESTERS
Thwing Instrument Co.

SCREEN AND SCREEN PLATE CLEANERS
Oakite Products, Inc.

SCREEN PLATE
Green Bay Foundry & Mach. Co.
Hardy & Sons Co., W. A.
Union Screen Plate Co.

SCREENS
Beloit Iron Works
Bird Machine Co.
Glens Falls Machine Works
Horne & Sons Co., J. H.
Moore & White Co.
Shartle Bros. Machine Co.
Valley Iron Works

SEALING TAPE (Gummed)
Paper Manufacturers, Inc.

SEMI-STEEL PULLEYS
Jones Foundry & Machine Co., W. A.

SHOWER PIPES
Bird Machine Company
DeZurik Showers Co., The
Emerson Mfg. Co.
Green Bay Foundry & Mach. Co.
Moore & White Mfg. Co.
Roberts Mfg. Co.
Shartle Bros. Machine Co.
Paper & Textile Machinery Co., The

SHOWERS (Foam Laying)
DeZurik Shower Co., The

SHREDDERS (Pulp and Paper)
Carthage Machine Co.
Central Machine Works
Jeffrey Mfg. Co.
Ryther & Pringle Co.
Taylor Stiles & Co.

SILICATE OF SODA
Philadelphia Quartz Co.

SIZING PROCESS
American Delthirna Corp.

SKID-EM-ONS
Central Machine Works

SLASHERS
Murray, D. J., Mfg. Co.
Ryther & Pringle

SLIME REMOVERS
Magnuson Products Co.
Oakite Products, Inc.

SLITTERS AND REWINDERS
Beloit Iron Works
Cameron Machine Co.
Dietz Machine Works
Gibbs-Brower Co.
Inman Manufacturing Co.
Langston Co., Samuel M.
Moore & White Co.
Shartle Bros. Machine Co.
Waldron Corporation, John

SLUICE GATES
Dayton Beater & Hoist Co.
Hunt Machine Co., Rodney

SODA ASH
Diamond Alkali Company
Mathieson Alkali Works, Inc.
Pennsylvania Salt Mfg. Co.
Solvay Process Co.

SOFTENERS and PURIFIERS, Water (Chemical)
Permutit Company

SOLVENT SIZING
Beloit Iron works
Black-Clawson Company
Pusey & Jones Corporation
Rice, Barton & Fales, Inc.

SORTING TABLES
Moore & White Co.

SPECIAL MACHINERY
Paper Converting Machine Co., Inc.
John Waldron Corp.

SPEED CHANGES (Variable)
Moore & White Co.

SPEED REDUCERS
De Laval Steam Turbine Co.
Farrel-Birmingham, Co.
Foote Bros. Gear & Machine Co.
Link-Belt Co., The
Jones Foundry & Machine Co., W. A.
Mid-West Fulton Machine Co., The
Philadelphia Gear Works

SPEED REDUCERS (Herring Bone)
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link-Belt Co.
Philadelphia Gear Works

SPEED REDUCING GEARS (Double Helical)
De Laval Steam Turbine Co.
Farrel-Birmingham, Co.
Philadelphia Gear Works

SPIRAL BEVEL GEAR DRIVES

SPIRAL BEVEL GEAR DRIVE STANDS
Moore & White Co.
Philadelphia Gear Works

SPIRAL CONVEYORS
Caldwell & Son Co., H. H.

SPIRAL LOCK-SEAM PIPE
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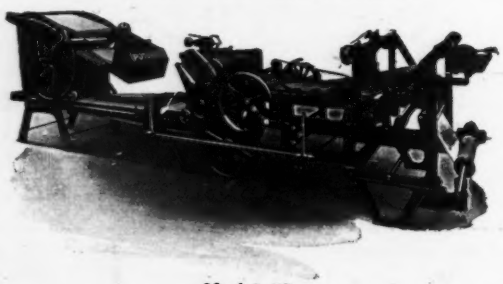

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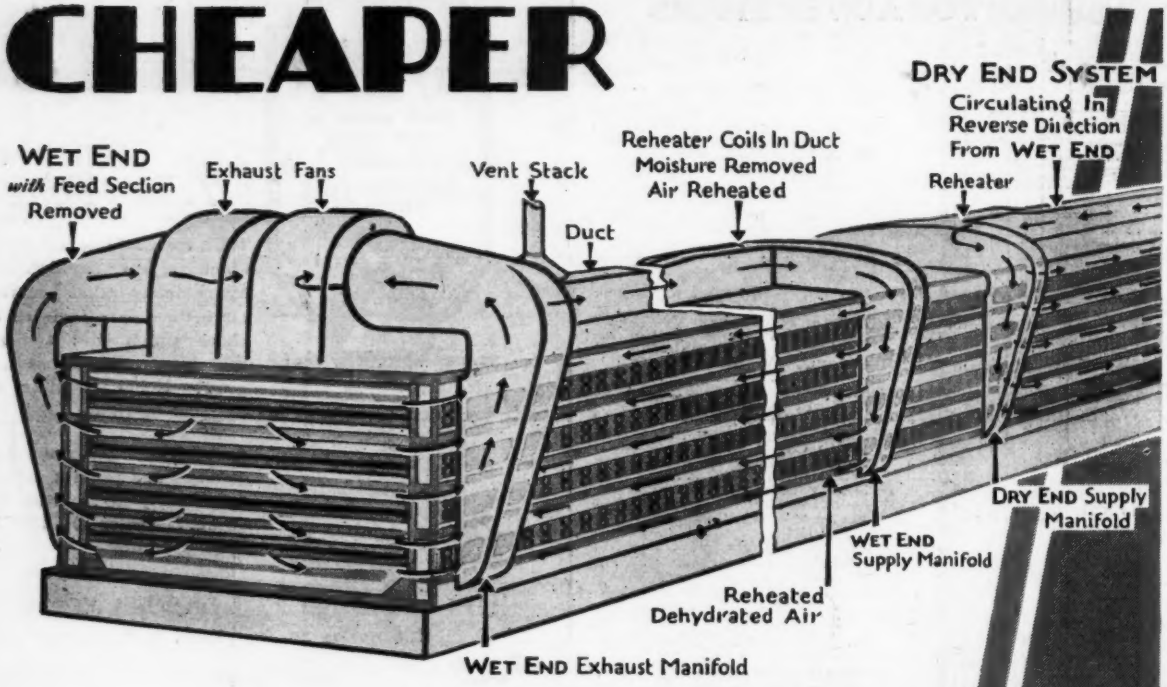

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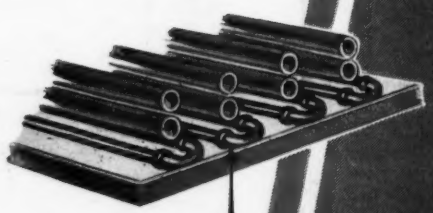

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